RESEARCH AND TECHNOLOGY SPECIAL REPORT

on the

NASA PROGRAM

in

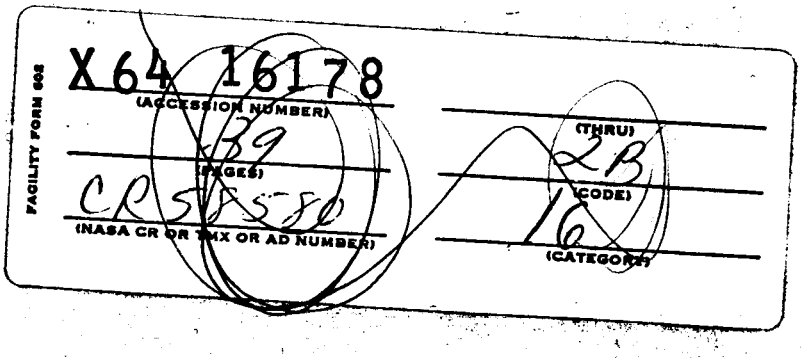
HUMAN FACTORS AND BIOSCIENCES

and the

ASSOCIATED PHASES OF THESE PROGRAMS

in the

MANNED SPACECRAFT SYSTEMS PROGRAM



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An Extraction From: Research and Technology Program Digest FY 63

National Aeronautics and Space Administration, Washington, D.C. 14 October 6

PROGRAMMATIC LISTING OF TASKS BY THE FOLLOWING PROGRAMS AND SUB-PROGRAMS

PROGRAMS

77 HUMAN FACTORS SYSTEMS PROGRAM
87 BIOSCIENCE PROGRAM
91 MANNED SPACECRAFT SYSTEMS PROGRAM

SUB-PROGRAMS

49 HUMAN PERFORMANCE AND BEHAVIOR
50 PERFORMANCE PHYSIOLOGY
51 PHYSICAL BIOLOGY
52 BEHAVIORAL BIOLOGY
53 LIFE SUPPORT
54 ENVIRONMENTAL BIOLOGY
55 EXOBIOLOGY
56 CREW SELECTION AND TRAINING CRITERIA

77 HUMAN FACTORS SYSTEMS PROGRAM
770 Director of Biotechnology and Human Research

49 Human Performance & Behavior Sub-program

01 PERCEPTION TASK AREA

21-77-770-100-49-01-01 Neurohormonal Studies as Related to Space Flight Stresses —Ames

Neurohormonal aspects of brain mechanisms and stress. (1) To identify the neurohormone from the hypothalamus which releases ACTH from the pituitary. Evidence so far indicates that this is Vasopressin (ADH). (2) To assay Vasopressin in brain tissue, in jugular blood and in C-S fluid in animals under various physiological and "unphysiological" conditions such as physical and psychological stresses. (3) To investigate the mechanisms by which Vasopressin is released from the hypothalamus under stress and role of Vasopressin in the synthesis and degradation of ACTH (with Dr. Stanley Ellis). (4) To measure adrenal steroids and catecholamines in blood and urine in animals and man under stress conditions.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	EFFORT Contr
	7162	1163			
Installation Tech. Rep.	ANDERSON E			X	X
Contractor	NOT REPORTED		Location of work		
Task Status	REPLA	FY 63 Man Yrs	Prof 2.	Tot 4.	

21-77-770-100-49-01-02 Pituitary Chemistry —Ames

To determine the nature of the chemical and physiological mechanisms responsible for the bio-synthesis, storage and secretion of pituitary hormone with particular reference to the effects of stresses such as may be encountered during manned space flights.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	EFFORT Contr
	1163	1163			
Installation Tech. Rep.	ELLIS S			X	
Task Status	NEW	FY 63 Man Yrs	Prof 1.	Tot 2.	

10-77-770-100-49-01-03 Respiratory —Hdqt

To determine the optimum space cabin environment and the hazards resulting from variations in environmental gas concentrations.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	EFFORT Contr
	7162				
Installation Tech. Rep.	NOT REPORTED				X
Contractor	DR B WELCH		Location of work		
Task Status	NEW	FY 63 Man Yrs	Prof .	Tot .	

21-77-770-100-49-01-03 Research in Cerebral Neurophysiology and Its Applications in Monitoring Behavioral States —Ames

To pursue cerebral neurophysiological studies including (1) the feasibility of placing recording electrodes in deep brain structures, (2) effects of vibrational stresses on brain electrical activity, (3) studies of cosmic ray effects on brain electrical activity, (4) chimpanzee neurophysiological and behavioral studies, (5) application of EEG recording to manned space flight, and (6) computor studies of EEG data.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	EFFORT Contr
	3163	3163			
Installation Tech. Rep.	FUGITT C H				
Contractor	CALIF UNIV OF		Location of work		CAL
Task Status	NEW	FY 63 Man Yrs	Prof .	Tot .	

10-77-770-100-49-01-05 Central Nervous System —Hdqt

To partially fund the National Academy of Sciences, National Research Council, Committees on Vision and on Hearing and Bio-Acoustics.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	EFFORT Contr
	7162				X
Installation Tech. Rep.	VORIS F				
Contractor	OFF OF NAVAL RES		Location of work		
Task Status	NEW	FY 63 Man Yrs	Prof .	Tot .	

10-77-770-100-49-01-06 Central Nervous Systems —Hdqt

To conduct a neurophysiological analysis of the "electronarcosis" phenomena with the aim of understanding the mechanisms for the physiological manipulation of consciousness.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	EFFORT Contr
	7162				X
Installation Tech. Rep.	VORIS F				
Contractor	WASHINGTON UNIV OF		Location of work		WASH
Task Status	NEW	FY 63 Man Yrs	Prof .	Tot .	

77 HUMAN FACTORS SYSTEMS PROGRAM
770 Director of Biotechnology and Human Research
49 Human Performance & Behavior Sub-program

01 PERCEPTION TASK AREA

10-77-770-100-49-01-07 Central Nervous System —Hdqt

Study the basic physiological mechanisms which defined the human body against heat and cold, and to determine the extent and efficiency of energy transformation in the human body and in isolated body constituents at the molecular level.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7162	|	|		
Installation Tech. Rep.	VQRIS FB				X
Contractor	US_NAVY MED RES INS	Location of work			
Task Status	NEW	FY 63 Man Yrs	Prof .	Tot .	

10-77-770-100-49-01-08 Central Nervous System —Hdqt

To obtain data on the variables that affect the threshold for thermal sensations at skin temperatures between 27° and 42°C, and to study the relationship between skin temperature, thermal threshold, and state of vasoconstriction.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7162	|	|		
Installation Tech. Rep.	OGDEN				X
Contractor	FLORIDA STATE UNIV	Location of work	FLA		
Task Status	NEW	FY 63 Man Yrs	Prof .	Tot .	

10-77-770-100-49-01-09 Gastrointestinal and Metabolic —Hdqt

The precise caloric, protein, and water requirements will be studied in 16 young male individuals per year. Individual amino acid, caloric, and water requirements will be studied under controlled baseline conditions. Altered requirements due to changes in pressure, temperature, activity, and the wearing of a full pressure suit will be studied using the AMRL Space Vehicle Environment Simulator.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7162	|	|		
Installation Tech. Rep.	NOT_REPORTED				X
Contractor	USAF AEROSPACE MED	Location of work			
Task Status	NEW	FY 63 Man Yrs	Prof .	Tot .	

10-77-770-100-49-01-10 Endocrine —Hdqt

To determine the effects of chronic hypoxia, cold, exercise, and stress upon erythropoiesis and adrenal cortical function during ascent of Mount Everest.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7162	|	|		
Installation Tech. Rep.	OGDEN				X
Contractor	AMER MT EVEREST EXP	Location of work			
Task Status	NEW	FY 63 Man Yrs	Prof .	Tot .	

02 ENVIRONMENTAL PHYSIOLOGY TASK AREA

10-77-770-100-49-02-01 Ion Effects on Man —Hdqt

Analyze the existing experimental data on man and animals to determine the effects of positive and negative ions in order to either write habitability requirements for prolonged confinement in space cabins or indicate avenues of research that must be pursued in order to determine adequate design criteria.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7162	|	|		
Installation Tech. Rep.	CONNOR J_A JR				X
Contractor	NOT_REPORTED	Location of work			
Task Status	NEW	FY 63 Man Yrs	Prof .	Tot .	

21-77-770-100-49-02-01 Vision, Circulation and Respiration under Sustained Acceleration —Ames

Sustained linear acceleration regardless of how applied to the body affects adversely the function of the respiratory, cardiovascular and visual systems in the body. Past investigations have delineated the nature of these effects. It is necessary to further investigate more specifically the character and magnitude of these adverse effects in order to determine the ideal physical orientation of the pilot in relation to the motion of a vehicle so as to permit the optimum physiological performance.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7162	7162	|		
Installation Tech. Rep.	MATTER M			X	X
Contractor	VIDYA_INC	Location of work	CAL		
Task Status	NEW	FY 63 Man Yrs	Prof 3,5	Tot 7.	

10-77-770-100-49-02-02 Acceleration —Hdqt

To analyze the role and function of the vestibular canals and in particular to study the relationships between rotational stimulation of the labyrinth and the variables of circulation and respiration.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In House	Contr
7 1 62				
Installation Tech. Rep. VQRIS F				X
Contractor MEDICAL COLLEGE VA	Location of work VA			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-77-770-100-49-02-02 Study of Long-Term Effects of Low G-loading on Mammals (mice, rats, etc.) —Ames

To study the effects of long-term exposure to an altered G environment (by centrifugation) of various mammals including mice, rats. Physiologic and biochemical effects will be measured to delineate those responses which are G-responsive. Control data as well as test animal data will ultimately be applied to setting up specific experiments for sustained zero G studies. Adaptive changes in the homeostatic processes will be followed in supra one G adapted animals when they are returned to normal G environment. Intracellular effects of sustained G loading will be studied particularly changes in fat and carbohydrate metabolism of mitochondria and protein metabolism of isolated microsomal fractions. Alterations in blood and tissue isoenzymes will be studied. Metabolic studies both at the whole animal level as well as the tissue and cellular levels will be followed with labeled substrates.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In House	Contr
7 1 62	7 1 62			
Installation Tech. Rep. OYAMA J			X	
Task Status NEW	FY 63 Man Yrs	Prof 2.	Tot 2.	

10-77-770-100-49-02-03 Acceleration —Hdqt

To take the existing information both analytical and research, and summarize all the acceleration effects; that is, including positive, negative, high-G, random-G (tumbling) and acoustics (vibration and noise), and their effects on man in order to determine design criteria, as well as to point out effects of research required to answer problem areas for future aerospace vehicles.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In House	Contr
7 1 62				
Installation Tech. Rep. CONNOR J				X
Contractor NOT REPORTED	Location of work			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-77-770-100-49-02-03 Metabolism of Animals as Influenced by Space Environmental Conditions —Ames

The purpose of this research is to undertake a study of the total body metabolism of mammals under conditions which simulate prolonged space voyages to determine whether environmental conditions encountered alter the normal pattern.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In House	Contr
7 1 62	1 1 63			
Installation Tech. Rep. FELLER D D			X	
Task Status REPLA	FY 63 Man Yrs	Prof 2.	Tot 3	

10-77-770-100-49-02-04 Acceleration —Hdqt

To determine the mechanisms by which force fields will produce disorientation and functional disturbances by their effects upon the se... circular canals and otolith organs of the inner ear. Normal and altered vestibular function will be studied.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In House	Contr
7 1 62				
Installation Tech. Rep. VQRIS F B				X
Contractor US NAVY BUR MEDICIN	Location of work			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-77-770-100-49-02-04 Radiation Dosimetry and Measurement —Ames

To develop techniques and devices which will improve the basic understanding of the interaction of radiation with living organisms and provide optimum design criteria for satellite instrumentation.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In House	Contr
1 1 63	1 1 63			
Installation Tech. Rep. MALICH C W			X	
Task Status NEW	FY 63 Man Yrs	Prof .8	Tot 1.5	

10-77-770-100-49-02-05 Radiation —Hdqt

Contractor will develop a technique for calibration of different types of radiation on a scale showing dose vs. cell destruction. It is planned to establish a common unit (Linear Energy Transfer) as an index of cell destruction (various radiations will show various LET's). Study is effected to provide a unifying indicator for radiation damage for a mixed or pure spectrum. A prime objective appears to be fabrication of instrumentation that will measure the absorbed dose within a scattering medium of yeast cells.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In House	Contr
7 1 62				
Installation Tech. Rep. CONNOR J A JR				X
Contractor AVCO CORP	Location of work			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-77-770-100-49-02-05 Theoretical Study of High Energy Radiations in Relation to Biological Systems —Ames

Physical characteristics of high energy radiations in space will be compared to those of man-made radiations in order to predict equivalent biological changes. Tolerance limits of the central nervous system for heavy cosmic ray primaries will be estimated and related to other deleterious effects which may be mitigated by drugs or local shielding.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In House	Contr
1 1 63	1 1 63			
Installation Tech. Rep. MALICH C W			X	
Task Status NEW	FY 63 Man Yrs	Prof 1.5	Tot 1.5	

77 HUMAN FACTORS SYSTEMS PROGRAM
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02 ENVIRONMENTAL PHYSIOLOGY TASK AREA

10-77-770-100-49-02-06 Radiation —Hdqt

1. Study biological effects of 730 Mev protons (184-inch cyclotron). 2. Study biological effects of heavy ions up to 30 Mev per nucleon (88" cyo). 3. Study proton and other heavy ion interactions with potential shield materials and other spacecraft components. 4. Basic molecular and cellular effects of accelerated particles.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 1 62					X

Installation Tech. Rep.: CONNOR J A JR

Contractor: CALIF UNIV OF — Location of work: CAL

Task Status: NEW | FY 63 Man Yrs | Prof | Tot

21-77-770-100-49-02-08 Effects of High G Loading on Metabolism —Ames

To determine the effects of high G-loading on the metabolism of mice.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
1 1 63		1 1 63		X	

Installation Tech. Rep.: MIQUEL

Task Status: NEW | FY 63 Man Yrs | Prof .5 | Tot .8

10-77-770-100-49-02-07 Radiation —Hdqt

1. Species correlation, principally mammalian, of biological effects of high energy proton irradiation, partial and whole body. Work to be compared with previous studies using neutron, x- and gamma radiation. 2. Calculate RAD and REM doses in human phantoms as a function of radiation energy. 3. Determine physical parameters which may be correlated with biological damage. 4. Develop practical physical methods to measure radiation hazard to man and biological systems.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 1 62					X

Installation Tech. Rep.: CONNOR J A

Contractor: ATOMIC ENERGY COMM — Location of work: TENN

Task Status: NEW | FY 63 Man Yrs | Prof | Tot

21-77-770-100-49-02-07 Pathological Studies on the Brains of Mice and One Monkey to be Exposed to Cosmic Radiation in High Altitude Balloon Flights —Ames

Extension of Project R-26: To cover cost of serially sectioning the brains of the increased number of animals flown in balloon flights on original project. This means processing and analyzing 90,000 more histological slides than was previously covered in the initial statement.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
1 1 63		1 1 63		X	

Installation Tech. Rep.: HAYMAKER W

Task Status: NEW | FY 63 Man Yrs | Prof .3 | Tot .3

10-77-770-100-49-02-03 Radiation —Hdqt

To determine the energy dissipation characteristics in tissue for ionizing radiation in space.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 1 62					X

Installation Tech. Rep.: CONNOR J A JR

Contractor: US NAVY BUR MEDICIN — Location of work:

Task Status: NEW | FY 63 Man Yrs | Prof | Tot

21-77-770-100-49-02-08 Space Physiology (Extension of NsG 139-61) —Ames

To establish base-line data on physiological parameters of function in mammals under conditions which simulate those to be found within a vehicle in interplanetary flight.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
3 1 63		3 1 63			X

Installation Tech. Rep.: FUGITT C H

Task Status: NEW | FY 63 Man Yrs | Prof | Tot

10-77-770-100-49-02-09 Predominating Fecal Flora in Man —Hdqt

To utilize an anaerobic technique to isolate intestinal flora bacteria, in subjects that are under normal conditions and subsequently placed in space flight environments. The study will evaluate the influence of space conditions on the balance of man's intestinal flora and man's reaction to any change in this balance.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 1 62					X

Installation Tech. Rep.: VORIS F B

Contractor: REPUBLIC AVIATION — Location of work: NY

Task Status: NEW | FY 63 Man Yrs | Prof | Tot

21-77-770-100-49-02-09 Histopathological Study of the Effect of Fission Fragments on the Central Nervous System and Selected Organs (NAS 2-1336) —Ames

To study the biological effects of energetic, massive, highly charged particles on rats. The cosmic particles will be simulated by fission fragments actually generated within the bodies of the rats. The cellular effects of the fission fragments will be studied histopathologically. The toxicity of compounds containing uranium and plutanium will also be determined.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 1 62		7 1 62			X

Installation Tech. Rep.: FUGITT C H

Contractor: WESTINGHOUSE ELECTR — Location of work: PA

Task Status: NEW | FY 63 Man Yrs | Prof | Tot

10-77-770-100-49-02-10 Non-Ionizing Energy Fields —Hdqt

To analyze the existing animal and human data in high, low, and nul magnetic fields for application to design of manned space systems and to point out possible human research requirements if magnetic field effects are not sufficiently understood and documented. This study will be coordinated with the present study on magnetic fields on animals sponsored by NASA Biosciences, and with current work being conducted by the Atomic Energy Commission

and other agencies. To determine the effects and precautions required for life in environments containing abnormal levels of non-ionizing energy such as ultra frequency, radio frequency energy and light (laser emission, etc.).

Task Form 1st Dates Issue	7162	Curr Issue		Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	CHATHAM G N						X
Contractor	NOT REPORTED			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-77-770-100-49-02-10 Parametric Study of Flight-Induced Pulmonary Pathology —Ames

A series of experiments will be conducted for determining the environmental conditions associated with the pulmonary pathology observed in pilots of high-performance aircraft. Selected human subjects will be centrifuged through an analogue of the Apollo reentry g profile, while systematic variations of the following parameters are imposed: breathing gas pressure; breathing gas composition; and the duration and direction of g-loads. Sufficient measures will be employed to describe the physiological condition of each subject during the experiments. Resulting data will be analyzed to determine the conditions that induce pulmonary pathology, and the physiological changes that induce, or are associated with the onset of the pathological response.

Task Form 1st Dates Issue	7162	Curr Issue	7162	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	FUGITT C H						X
Contractor	GARRETT CORP			Location of work	CAL		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

10-77-770-100-49-02-11 Non-Ionizing Energy Fields —Hdqt

To study the effects of high and low magnetic fields on animals and human beings.

Task Form 1st Dates Issue	7162	Curr Issue		Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	VORIS F B						X
Contractor	US NAVY BUR MEDICIN			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-77-770-100-49-02-11 Electroneurophysiological—Task Performance Correlates —Ames

An experimental investigation of variations of the electroneurophysiological correlates and task-performance under conditions of controlled stimuli. It is planned to use both pigtail monkeys and chimpanzees.

Task Form 1st Dates Issue	1163	Curr Issue	1163	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	FUGITT C H						X
Contractor	HENRY FORD HOSP			Location of work	MICH		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

10-77-770-100-49-02-12 Atmospheric Conditions —Hdqt

Determination of the possible neuropathological effects of prolonged exposure of rabbits and mice to a 100 per cent oxygen atmosphere.

Task Form 1st Dates Issue	7162	Curr Issue		Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	NOT REPORTED						X
Contractor	NOT REPORTED			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-77-770-100-49-02-12 Biological Research with Heavy Ion Beams —Ames

Biological Research with Heavy Ion Beams.

Task Form 1st Dates Issue	1163	Curr Issue	1163	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	FUGITT C H						X
Contractor	ATOMIC ENERGY COMM			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

10-77-770-100-49-02-13 Atmospheric Conditions —Hdqt

Study of the metabolic, biochemical, biophysical, and histologic characteristics of oxygen toxicity in isolated tissues of animals exposed to 100 per cent oxygen at atmospheric pressures varying from 7.4 psi to 14.7 psi.

Task Form 1st Dates Issue	7162	Curr Issue		Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	NOT REPORTED						X
Contractor	US AIR FORCE			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-77-770-100-49-02-13 Dosimetry of High Energy Radiation —Ames

Dosimetry of High Energy Radiation.

Task Form 1st Dates Issue	1163	Curr Issue	1163	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	FUGITT C H						X
Contractor	ATOMIC ENERGY COMM			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

10-77-770-100-49-02-14 Atmospheric Conditions —Hdqt

To study the hematological and hematopoietic effects of a 100 per cent oxygen environment.

Task Form 1st Dates Issue	7162	Curr Issue		Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	NOT REPORTED						X
Contractor	US AIR FORCE			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

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21-77-770-100-49-02-14 Post-Mortem Clinical Analysis of Biological Specimens —Ames

Post-mortem chemical analysis of biological material will be undertaken to establish the ante-mortem status of individuals in closed space systems. New biochemical methods and techniques will be developed for this purpose.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	1 1 63	1 1 63			

Installation Tech. Rep.: FUGITT O H — X

Contractor: AFJP — Location of work: DC

Task Status: NEW — FY 63 Man Yrs: — Prof: . — Tot: .

10-77-770-100-49-02-15 Radiation —Hdqt

This project is a continuation of ten-year observations on some 475 irradiated and 104 control primates throughout the remainder of the primate's life for long term effects studies in cataractogenesis, longevity, and carcinogenesis.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7 1 62				

Installation Tech. Rep.: NOT REPORTED — X

Contractor: USAF SYSTEMS COMMAND — Location of work: TEX

Task Status: NEW — FY 63 Man Yrs: — Prof: . — Tot: .

10-77-770-100-49-02-16 Radiation —Hdqt

1. Measurements of dose and depth dose distribution produced by protons of various energies. 2. Determination of effects of proton irradiation in animals. 3. Provide dosimetry for proton irradiation of biological samples. 4. Calibrate solid-state detectors for future use as active dosimeters.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7 1 62				

Installation Tech. Rep.: NOT REPORTED — X

Contractor: USAF SYSTEMS COMMAND — Location of work: TEX

Task Status: NEW — FY 63 Man Yrs: — Prof: . — Tot: .

10-77-770-100-49-02-17 Radiation —Hdqt

To study the modification of ionizing radiation effects in primates with transfusions of the specific blood cell types in Hematopoietic tissue.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7 1 62				

Installation Tech. Rep.: NOT REPORTED — X

Contractor: USAF SYSTEMS COMMAND — Location of work: TEX

Task Status: NEW — FY 63 Man Yrs: — Prof: . — Tot: .

10-77-770-100-49-02-18 Acceleration —Hdqt

To investigate the interacting effects of hydrostatic pressure and low temperature upon the reanimation of infant and adult mammals in hypothermic suspended animation after removal of the gas phase. This will be carried out in a static hydraulic pressure chamber to remove the complicating effect of acceleration as reported in the preliminary study. The additional effect of acceleration will then be studied in the centrifuge.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7 1 62				

Installation Tech. Rep.: NOT REPORTED — X

Contractor: CINCINNATI UNIV OF — Location of work: OHIO

Task Status: NEW — FY 63 Man Yrs: — Prof: . — Tot: .

10-77-770-100-49-02-19 Environmental Physiology —Hdqt

1. Study biological effects of 160 Mev protons, principally on neurological tissues, with emphasis on the brain. 2. Study proton interactions with potential shield materials and other spacecraft components. 3. Basic molecular and cellular effects of 160 Mev accelerated particles. This task will be closely coordinated with HQ and AEC.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7 1 62				

Installation Tech. Rep.: OGDEN — X

Contractor: HARVARD UNIV — Location of work: MASS

Task Status: NEW — FY 63 Man Yrs: — Prof: . — Tot: .

10-77-770-100-49-02-20 Radiation —Hdqt

1. Ascertain if carcinogenesis will result from exposure to either cosmic radiation and/or the Van Allen radiation belts. 2. Improve predictions concerning hazards of space travel.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7 1 62				

Installation Tech. Rep.: NOT REPORTED — X

Contractor: MICHIGAN UNIV OF — Location of work: MICH

Task Status: NEW — FY 63 Man Yrs: — Prof: . — Tot: .

10-77-770-100-49-02-21 Free Space—Extravehicular and Surface Environmental Studies —Hdqt

1. Establish base line data on physiological parameters of high level mammalian organisms under conditions corresponding as closely as possible to those in a flight vehicle in the interplanetary environment. 2. Development of sensors to accomplish #1 above. 3. Dev. of prototype device for completely isolated holding (with minimum restraint, and remote observation) of animals as though they were in space. 4. Establishment of new studies in chemistry and physical level of Biology.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
6163	6163	6166		
Installation Tech. Rep. NOT_REPORTED				X
Contractor CALIF_UNIV OF _	Location of work CAL			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

03 BIO MEDICINE AND PERSONNEL SELECTION TASK AREA

10-77-770-100-49-03-01 Pharmacology, Prophylaxis and Therapy —Hdqt

To determine the differential localization of thiethylperozine in cellular areas and its specific localization within the fine structures of cerebellar cells.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7162				
Installation Tech. Rep. VORIS F B				X
Contractor TULANE_UNIV _	Location of work LA			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-77-770-100-49-03-01 Ocular Impedance Plethysmography —Ames

To ascertain the possible capability of measuring changes in intraocular tension of the eye (similar to that which takes place in glaucoma) when a subject is placed in a stressful situation such as sustained, impact or vibratory acceleration.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7162	7162			
Installation Tech. Rep. MATTER M			X	
Task Status NEW	FY 63 Man Yrs	Prof .5	Tot .5	

10-77-770-100-49-03-02 Toxicology —Hdqt

To partially support the Toxicology Center and the Armed Forces-NRC Committee on Toxicology in order to obtain information and advice concerning toxic fuels, combustion products, and trace contaminants that are likely to be involved in manned flight operations.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7162				
Installation Tech. Rep. VORIS F B				X
Contractor NOT_REPORTED	Location of work			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

23-77-770-100-49-03-04 Effect of Rough Air on Aircraft Crew Performance —LRC

Using simulator setups which provide motion, the performance of an observer doing tasks pertinent to a low altitude surveillance mission will be measured under conditions simulating flight in various levels of rough air.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
8162	4163			
Installation Tech. Rep. VOGELEY A W			X	
Task Status REPLA	FY 63 Man Yrs	Prof .2	Tot .2	

05 HABITABILITY TASK AREA

10-77-770-100-49-04-01 Natural Rhythmic and Circadian Patterns —Hdqt

To study the relationship of diurnal cycles of physiological functions and performance under conditions of constant environmental and shifting time schedules.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7162				
Installation Tech. Rep. VORIS F B				X
Contractor US_NAVY_BUR MEDICINE	Location of work CONN			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-77-770-100-49-04-01 Auditory Perception During Space Mission —Ames

Work performed under this task will (1) determine auditory requirements of space system operation (FY '63) (2) identify potential problems of auditory sensation and perception due to anticipated mission conditions (FY '63) and (3) perform research pertinent to the solution of these problems (FY '63-'64). Laboratory methods will be employed to provide needed information concerning basic auditory processes, to specify man's capabilities and limitations in audition, and to develop and evaluate space system hardware which involves the auditory process. Contracts (contractor not yet determined) will be awarded to study specialized aspects of auditory processes.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7162	7162	6164		
Installation Tech. Rep. PATTON_R M			X	
Task Status NEW	FY 63 Man Yrs	Prof 1.5	Tot 3	

23-77-770-100-49-04-01 Studies of Man in a Rotating Environment —LRC

To determine human tolerance and adaptation to rotation. The results will be useful in manned space station design.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7162	4163			
Installation Tech. Rep. STONE R_W JR.			X	X
Contractor SPACELABS INC _	Location of work CAL			
Task Status REPLA	FY 63 Man Yrs	Prof .	Tot .	

10-77-770-100-49-04-02 Information Reception & Transmission —Hdqt

To analyze the structure, function and performance of biosensors and compare these biomechanisms with their analogous physical transducers in order to evaluate applicability to instrumentation design.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7162				
Installation Tech. Rep. CHATHAM_G N				X
Contractor ALLIED RES_ASSOC	Location of work MASS			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

77 HUMAN FACTORS SYSTEMS PROGRAM
770 Director of Biotechnology and Human Research
49 Human Performance & Behavior Sub-program

04 PSYCHO-PHYSIOLOGY AND BEHAVIODRAL SCIENCES TASK AREA

21-77-770-100-49-04-02 Visual Perception During Space Missions —Ames

Work performed under this task will (1) determine visual requirements of space system operation (FY '63), (2) identify potential problems of visual perception due to anticipated mission conditions (FY '63) and (3) perform research to solve these problems (FY '63-64). Laboratory methods and ground-based simulators will be employed to provide needed information concerning basic visual processes, to specify man's capabilities and limitations, and to develop and evaluate space system hardware (including information displays) which involve the visual process. Where appropriate, experiments will be developed to be conducted under actual space operating conditions. Contracts (contractor not yet determined) will be awarded to study specialized aspects of visual performance.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7162	7162	6164		
Installation Tech. Rep. PATTON R M			X	X
Contractor TEXAS CHRISTIAN UN	Location of work TEX			
Task Status NEW	FY 63 Man Yrs	Prof 3.	Tot 6.	

23-77-770-100-49-04-02 Determination of Visual Acuity —LRC

To determine visual acuity with regard to such tasks as depth perception, closure rate perception, angular rate perception, target acquisition, etc., with regard to such space operations as rendezvous, docking, lunar landing, etc.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7162	4163	|		
Installation Tech. Rep. VOGELEY A W			X	X
Contractor NOT REPORTED	Location of work			
Task Status REPLA	FY 63 Man Yrs	Prof .5	Tot .8	

10-77-770-100-49-04-03 Cerebral Mechanisms —Hdqt

To develop techniques for the recording of brain wave activity in primates during space simulation stresses, including techniques for deep and surface electrode implantation, the establishment of EEG baselines for various physiological states, and techniques for data reduction and analysis.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7162	|	|		
Installation Tech. Rep. VORIS F				X
Contractor CALIF UNIV OF	Location of work COLO			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-77-770-100-49-04-03 Decision Making in Space System Operation —Ames

Work performed under this task will (1) determine requirements for judgments and decisions associated with space system operation (FY '63), (2) identify potential problems related to the operation of such systems (FY '63), and (3) perform research pertinent to the solution of these problems (FY '63-'64). Determination will be made of man's capabilities in responding both to the ordinary and to unexpected events of space missions. Both laboratory methods, and ground-based simulators will be used. Where appropriate, research will be conducted under actual space system operating conditions. Contracts (contractor not yet determined) will be awarded to study specialized aspects of the decision-making process.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7162	7162	6164		
Installation Tech. Rep. TANNER T A			X	
Task Status NEW	FY 63 Man Yrs	Prof 2.	Tot 3	

10-77-770-100-49-04-04 Cerebral Mechanisms —Hdqt

To develop techniques for the recording and analysis of brain wave activity in primates during space simulation stresses. The scope of the work includes development of implantation methods for surface and for deep electrodes, the establishment of baseline data for EEG in the primates in all normal states including emotional arousal, application of data reduction techniques to the EEG recordings, including computer analysis. The project aims ultimately at the utilization of EEG as a measure of the ability of a primate or a man to perform under conditions of space travel.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7162	|	|		
Installation Tech. Rep. NOT REPORTED				X
Contractor HENRY FORD HOSP	Location of work MICH			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

23-77-770-100-49-05-01 Examination of Methods for Simulating Zero "G" —LRC

To develop devices for creating the sensations of zero "g" for relatively long periods of time (one hour or more) and to study man's ability to perform tasks under these conditions.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7162	4163	|		
Installation Tech. Rep. STONE R W JR			X	
Task Status REPLA	FY 63 Man Yrs	Prof .5	Tot .5	

23-77-770-100-49-05-02 Human Behavior and Performance During Simulated Long Duration Missions —LRC

To study crew behavior performance under conditions simulating long-duration space missions with the objective of avoiding any deleterious effects.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7162	4163	|		
Installation Tech. Rep. VOGELEY A W			X	
Task Status REPLA	FY 63 Man Yrs	Prof 2.	Tot 2.5	

51 Physical Biology Sub-program

01 BIOCHEMICALS TASK AREA

10-77-770-100-51-01-01 Effects of Isolation, Sensory Deprivation & Sensory Rearrangement —Hdqt

The investigator will study the effects of sensory rearrangement, specific sensory deprivation & Isolation factors on basic sensory thresholds, including the analysis of evoked potentials & physiological indices (EEG, EKG, GSR, etc.).

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
2163	2163	|		
Installation Tech. Rep. DEUTSCH S				X
Contractor YESHIVA UNIV	Location of work NY			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-77-770-100-51-01-01 Skilled Performance in Space Vehicle Control —Ames

Work performed under this task will (1) determine requirements placed upon the space system operator for complex motor skills performances (FY '63), (2) identify potential problems related to the operation of systems requiring such skills (FY '63), and (3) perform research pertinent to the development of maximally effective systems (FY '63-'64). Both laboratory methods, and ground-based simulators will be employed. Where appropriate, research will be conducted under actual space system operating conditions. Contracts (contractor not yet determined) will be awarded to study specialized aspects of skilled performance.

Task Form 1st Dates Issue	7162	Curr Issue	7162	Est Task Compl	6164	EFFORT In-House	Contr
Installation Tech. Rep.	WEICK R					X	X
Contractor	ALTOS SCIENTIFIC			Location of work	CAL		
Task Status	NEW	FY 63 Man Yrs		Prof	2	Tot	4

10-77-770-100-51-01-02 Handbooks of Human Factors Methods —Hdqt

The contractor will provide a study to determine the requirements and methodology for human factors system engineering and design for aerospace systems, manned and unmanned.

Task Form 1st Dates Issue	2163	Curr Issue	2163	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	DEUTSCH S						X
Contractor	AMER INST FOR RES			Location of work	PA		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-77-770-100-51-01-02 Communication in Space Operations —Ames

Work performed under this task will determine requirements for, and anticipated problems of communication within the space environment, and among launch crews on earth. A mathematical approach will be employed evaluating systems in use and specifying adequate communication systems for future use in accordance with both mission requirements and human capabilities. The adequacy of communication systems in task performance will be made in the laboratory, under simulated operating conditions, and in the actual operational environment when this is desirable and possible. Contracts (contractor not yet determined) will supplement in-house work in specialized areas of communications research.

Task Form 1st Dates Issue	7162	Curr Issue	7162	Est Task Compl	6164	EFFORT In-House	Contr
Installation Tech. Rep.	WEICK R					X	X
Contractor	STANFORD RES INSTI			Location of work	CAL		
Task Status	NEW	FY 63 Man Yrs		Prof	1.	Tot	2

10-77-770-100-51-01-03 Biological Mechanisms —Hdqt

To review biological mechanisms for application to instrument design. The cost increase resulted from an increase in overhead rates from 165% to 180% and a G&A rate of 12.5%.

Task Form 1st Dates Issue	3163	Curr Issue	3163	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	VORIS F B						X
Contractor	ALLIED RES ASSOC			Location of work	MASS		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-77-770-100-51-01-03 Pilot's Ability to Cope with Sudden Changes in the Controlled Element —Ames

To determine the ability of the pilot to cope with or adapt to abrupt changes in stability and damping such as stability augmenter failures; abrupt changes in information input, specifically transition from IFR to VFR and from normal to emergency display modes; and abrupt changes in control behavior, i.e., engine or power control failure and/or control surface damage. These situations will be created on motion simulators and in flight with variable-stabi aircraft to determine how the pilot adapts and what the quantitative limits his abilities are.

Task Form 1st Dates Issue	7162	Curr Issue	7162	Est Task Compl	1164	EFFORT In-House	Co
Installation Tech. Rep.	SADOFF M					X	
Task Status	NEW	FY 63 Man Yrs		Prof	2.5	Tot	5

10-77-770-100-51-01-04 Characteristics of the Segments of the Human Bod —H

For more accurate anatomical information in developm of restraint and protective systems, the investigators will determine mass, dens and center of gravity of 15 definitive body segments in 12 cadavers anthropon rically comparable to the Air Force flying population.

Task Form 1st Dates Issue	1163	Curr Issue	1163	Est Task Compl		EFFORT In-House	Co
Installation Tech. Rep.	VORIS F						
Contractor	US AIR FORCE			Location of work	OHIO		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-77-770-100-51-01-04 Application of Reliability Theory to the Allocation Function Between the Pilot and the Vehicle Systems—Ai

To develop analytical and experimental means for de mining the reliability of competing manual and automatic control systems mid-course and re-entry control of space vehicles. Procedures will then be de oped for using these determinations to assess the optimum allocation of con function between the crew and the vehicle systems and to assess the increas probability of mission success resulting from full use of the crews' control, m toring and decision-making abilities.

Task Form 1st Dates Issue	7162	Curr Issue	7162	Est Task Compl	6165	EFFORT In-House	C
Installation Tech. Rep.	WEMPE T					X	
Task Status	NEW	FY 63 Man Yrs		Prof	1.	Tot	2

10-77-770-100-51-01-05 Biological Mechanisms —

Additional funds required to cover increase in overi since execution of original contract.

Task Form 1st Dates Issue	6162	Curr Issue	9162	Est Task Compl		EFFORT In-House	C
Installation Tech. Rep.	VORIS F B						
Contractor	ALLIED RES ASSOC			Location of work	MASS		
Task Status	REPLA	FY 63 Man Yrs		Prof	.	Tot	.

77 HUMAN FACTORS SYSTEMS PROGRAM
770 Director of Biotechnology and Human Research
51 Physical Biology Sub-program

01 BIOCHEMICALS TASK AREA

21-77-770-100-51-01-05 Problem Areas Associated with Flight Through Turbulent Air —Ames

To consider the following aspects of flight through turbulent air, specifically the A2F, TFX, and SST mission profiles: (a) Control system feel requirements, stability augmentation, gust alleviation; (b) Crew station design, including restraint; (c) Display requirements; (d) Long-term effects on pilot and crew performance; (e) Passive passenger comfort and tolerance levels and (f) Simulator requirements. Motion simulators and an A2F will be used in conjunction with the NAA simulator.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7 1 62	7 1 62	6 1 62		
Installation Tech. Rep.	SADOFF M			X	
Task Status	NEW	FY 63 Man Yrs	Prof 2.5	Tot 5	

21-77-770-100-51-01-06 Vestibular Motion Cues Used by the Human Pilot —Ames

Thresholds and reaction latencies for perception of angular motion have been measured on Ames test pilots to limits feasible on existing 5°-of-freedom device. Specifications for more sensitive equipment have been prepared. Tests will be repeated on this, on Ames Space Flight Guidance Facility to determine effects of steady acceleration (1965) and in actual flight to determine effects of environment and combined unlimited maneuvers (1964-5). Thresholds and characteristics of visual perception of motion will also be determined to see how it relates to the vestibular functions. The effects of combined inputs and emergency stresses on recognition and latency will also be determined.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7 1 62	7 1 62	6 1 65		
Installation Tech. Rep.	STEWART J			X	
Task Status	NEW	FY 63 Man Yrs	Prof 2.5	Tot 4	

21-77-770-100-51-01-07 Human Pilot Control Problems in a Manned Planetary Landing —Ames

By piloted simulations and flight tests to determine the proper function of the human operator in a planetary landing system (atmospheric); to determine what characteristics should be built into the vehicle and its system for optimum performance and reliability; to determine requirements for adequate research and training simulators.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7 1 62	7 1 62	6 1 65		
Installation Tech. Rep.	MCFADDEN N			X	X
Contractor	BIOSYSTEMS INC		Location of work	MASS	
Task Status	NEW	FY 63 Man Yrs	Prof 2.	Tot 5	

21-77-770-100-51-01-08 Design Principles for Display and Control Systems for Recovery from Unusual Attitudes —Ames

To set up design principles aimed at providing increased pilot's capability in affecting recovery from unusual attitudes brought about by post-stall gyrations, transition from VFR to IFR flight (business aircraft) and lateral-directional cross-coupling. Possible use of alternative inputs such as display quickening, integrated director displays, aural and tactile input devices will be considered.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7 1 62	7 1 62	6 1 64		
Installation Tech. Rep.	RATHERT G			X	
Task Status	NEW	FY 63 Man Yrs	Prof 2.	Tot 4	

21-77-770-100-51-01-09 Human Pilot Control Problems in a Manual Abort of a Lunar or Planetary Mission —Ames

By analytical studies and piloted simulations to consider feasible control and navigation techniques under likely abort conditions; to determine optimum allocation of function between pilot and vehicle systems for reliability and performance; to determine requirements for adequate research and training simulation.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7 1 62	7 1 62	6 1 65		
Installation Tech. Rep.	HOWARD J C			X	
Task Status	NEW	FY 63 Man Yrs	Prof 1.	Tot 3	

21-77-770-100-51-01-10 Effects of Individual Environmental Stresses of Space Flight on Human Pilot Performance —Ames

To use closed-loop simulations with a human pilot placed in various NASA and DOD single-purpose environmental stress facilities to determine the effects on human performance of linear acceleration; short term weightlessness, vibration, impact, heat, pressure, and crew space habitability. A standard pilot task is used on centrifuges, Daisy track, heat and vacuum chambers, vibration device at WADD, and so forth.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7 1 62	7 1 62	6 1 64		
Installation Tech. Rep.	RATHERT G			X	
Task Status	NEW	FY 63 Man Yrs	Prof 2.5	Tot 6	

21-77-770-100-51-01-11 Biological Control Systems—A Comprehensive and Critical Review of the Field —Ames

To make a comprehensive review of the current state-of-knowledge in the field of biological control system. Review will include (1) appraisal of experimental programs, (2) evaluation of the state-of-engineering, and (3) discussion of the potential applicability of knowledge gained.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	3 1 63	3 1 63	1		
Installation Tech. Rep.	FUGITT C H				X
Contractor	BIOSYSTEMS INC		Location of work	MASS	
Task Status	NEW	FY 63 Man Yrs	Prof .	Tot .	

21-77-770-100-51-01-12 Utilization of Bioelectric Potentials. Support Phase I —Ames

To establish the feasibility of the utilization of the Bioelectric Potentials as a primary energy source for implanted electronic devices.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	3 1 63	3 1 63	1		
Installation Tech. Rep.	FUGITT C H				X
Contractor	GENERAL ELECTRIC		Location of work	PA	
Task Status	NEW	FY 63 Man Yrs	Prof .	Tot .	

02 INFORMATION ACQUISITION TASK AREA

10-77-770-100-51-02-01 M-MIC —Hdqt

To cover the cost of operation of the Man-Machine Information Center for one year.

Task Form 1st Dates Issue	12 62	Curr Issue	12 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	ANDERSON L O						X
Contractor	DOCUMENTATION INC	Location of work	MD				
Task Status	NEW	FY 63 Man Yrs	Prof	.	Tot	.	

21-77-770-100-51-02-01 *Operator Selection for Space Missions* —Ames

Work performed under this task will develop methods for selecting individuals for the performance of space missions. Man's activities in space system operation, and the conditions under which performance will occur, will be analyzed to determine requirements to be satisfied by the selection procedure. Methods of selection will be developed. Tests of man's response to conditions expected in space system operation (including inter-personal interactions) will be made in laboratory facilities and in ground-based simulators. Where appropriate, research will be conducted under actual space system operating conditions.

Task Form 1st Dates Issue	7 62	Curr Issue	7 62	Est Task Compl	6 65	EFFORT In-House	Contr
Installation Tech. Rep.	PATTON R M					X	X
Contractor	LAFAYETTE CLINIC	Location of work	MICH				
Task Status	NEW	FY 63 Man Yrs	Prof	2.	Tot	4.	

23-77-770-100-51-02-01 One-Man Vehicular Locomotion —LRC

To study the system requirements and pilot ability to control and navigate himself under zero gravity as in operations between and about orbiting vehicles. Analytical studies and simulations will be performed. The problem of rescue will also be studied as a special case.

Task Form 1st Dates Issue	7 62	Curr Issue	4 63	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	VOGELEY A W					X	X
Contractor	MARQUARDT CORP	Location of work	CAL				
Task Status	REPLA	FY 63 Man Yrs	Prof	1,8	Tot	25	

03 CONTROLS & OPERATIONS TASK AREA

10-77-770-100-51-03-01 Remote Control Systems —Hdqt

To determine the role of remotely controlled systems in future space missions, to define the various configurations such systems might take, and to recommend the development of advanced technology which can be utilized in the selection of specific systems for particular missions.

Task Form 1st Dates Issue	1 63	Curr Issue	1 63	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	ANDERSON L O						X
Contractor	LING TEMCO VOUGHT	Location of work	TEX				
Task Status	NEW	FY 63 Man Yrs	Prof	.	Tot	.	

21-77-770-100-51-03-01 Development of Physiological Montioring Equipment for Use in Motion Flight Simulators and Aircraft —Ames

To provide medical monitoring equipment for the motion flight simulators at the Ames Research Center, and for use in aircraft such as the F100C at the Flight Research Center and a back-up system for the X-15 aircraft. This program will permit refinement of the currently existing equipment with a view towards its being ultimately available for orbiting and space vehicles. A letter of request from FRC to ARC dated 10/27/61 requests this equipment.

Task Form 1st Dates Issue	7 62	Curr Issue	7 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	SMITH J R JR					X	
Task Status	NEW	FY 63 Man Yrs	Prof	3,	Tot	6	

24-77-770-100-51-03-01 Crew-Aircraft Integration —FRC

The objective of this task is to investigate the effect of mission requirements, crew number, and environment upon crew-aircraft integration.

Task Form 1st Dates Issue	3 63	Curr Issue	4 63	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	HOLLEMAN E C					X	
Task Status	REPLA	FY 63 Man Yrs	Prof	,3	Tot	,5	

10-77-770-100-51-03-02 Evaluation of Advanced Integrated Display & Control Systems —Hdqt

The contractor will review contemplated manned space missions subsequent to Apollo and establish a generalized mission envelope to serve as a basis for the design.

Task Form 1st Dates Issue	10 62	Curr Issue	10 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	ANDERSON L O						X
Contractor	LING TEMCO VOUGHT	Location of work	TEX				
Task Status	NEW	FY 63 Man Yrs	Prof	.	Tot	.	

21-77-770-100-51-03-02 Piloted Simulator Requirements for Effective Research, Development, and Training —Ames

To synthesize the available information on physiological sensors, cues used in actual flight, and comparisons between flight and all classes of simulator in order to develop a rational approach to difining simulator requirements for a given vehicle and system.

Task Form 1st Dates Issue	7 62	Curr Issue	7 62	Est Task Compl	6 64	EFFORT In-House	Contr
Installation Tech. Rep.	RATHERT G					X	
Task Status	NEW	FY 63 Man Yrs	Prof	1,	Tot	3	

10-77-770-100-51-03-03 Advanced Integrated Display & Control Systems —Hdq

To cover increased overhead costs.

Task Form 1st Dates Issue	10 63	Curr Issue	3 63	Est Task Compl		EFFORT In-House	Cont
Installation Tech. Rep.	ANDERSON L O						X
Contractor	LING TEMCO VOUGHT	Location of work	REPL				

77 HUMAN FACTORS SYSTEMS PROGRAM
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03 CONTROLS & OPERATIONS TASK AREA

23-77-770-100-51-03-03 Determination of Pilot Dynamic Characteristics —LRC

To study pilot's dynamic characteristics under actual and simulated flight conditions in order to find an objective measurement of performance and a mathematical description of the pilot in man-machine systems.

Task Form 1st Dates Issue			Curr Issue		Est Task Compl		EFFORT In-House	Contr
	12162	→	4163		1			
Installation Tech. Rep.	VOGELEY A W						X	X
Contractor	SPACE TECHNOLOGY LA	Location of Work	CAL					
Task Status	REPLA	FY 63 Man Yrs	Prof	1.7	Tot	2.5		

53 Life Support Sub-program

01 ATMOSPHERE CONTROL TASK AREA

10-77-770-100-53-01-01 Photosynthetic Gas Exchanger —Hdqt

To use a photosynthetic gas exchanger in a sealed, manned capsule to convert carbon dioxide into oxygen, and to recover and reuse non-carbon dioxide wastes.

Task Form 1st Dates Issue			Curr Issue		Est Task Compl		EFFORT In-House	Contr
	6162		6162		9164			
Installation Tech. Rep.	GIOVANNETTA A							X
Contractor	MINNESOTA UNIV OF	Location of work	MINN					
Task Status	NEW	FY 63 Man Yrs	Prof	.	Tot	.		

21-77-770-100-53-01-01 Heat Regulation at Reduced Pressures —Amos

It is the objective of this task to determine the characteristics of heat regulation at reduced atmospheric pressures. The investigation will be performed in an environmental vacuum chamber. The chamber will provide the means for radiative heat losses from an individual by varying the chamber wall temperature. Evaporative and convective cooling will be investigated under various conditions of atmosphere circulation rates and humidity.

Task Form 1st Dates Issue			Curr Issue		Est Task Compl		EFFORT In-House	Contr
	7162		7162		1			
Installation Tech. Rep.	LYMAN E G						X	
Task Status	NEW	FY 63 Man Yrs	Prof	1.	Tot	2.		

23-77-770-100-53-01-01 Development of Life Support Systems —LRC

To evaluate components of a life support system, and assess overall suitability of components as part of a total life support system. Work is in progress on evaluation of CO_2 removal system and H_2O reclamation system. Work with these components will extend to complete systems.

Task Form 1st Dates Issue			Curr Issue		Est Task Compl		EFFORT In-House	Contr
	7162	→	4163		1			
Installation Tech. Rep.	STONE R W JR						X	X
Contractor	GEN AMER TRANSPORT	Location of work	ILL					
Contractor	GENERAL DYNAMICS	Location of work	CONN					
Contractor	RES SYST INC	Location of work	MASS					
Task Status	REPLA	FY 63 Man Yrs	Prof	4.	Tot	8.		

10-77-770-100-53-01-02 Electrolyte Oxygen Generator —Hdqt

To design, fabricate and test 2 types of cells using P_2O_5 for removing water from the air and electrolysis to dissociate the water to breathable oxygen.

Task Form 1st Dates Issue			Curr Issue		Est Task Compl		EFFORT In-House	Contr
	3163		3163		1			
Installation Tech. Rep.	DEL DUCA							X
Contractor	ELECTROCHEMICA CORP	Location of work	CAL					
Task Status	NEW	FY 63 Man Yrs	Prof	.	Tot	.		

21-77-770-100-53-01-02 Regenerative Characteristics of Adsorbers Used in Environmental Control Systems —Amos

This study will basically evolve first a determination of the toxic elements in closed environmental systems. Methods of detecting these elements will have to be devised. At this time the study will proceed into the phase of determining the regenerative characteristics of chemical and other adsorbers which will best remove these toxic elements. The study will also investigate the effects that heat, vacuum and package configuration have on these adsorbers.

Task Form 1st Dates Issue			Curr Issue		Est Task Compl		EFFORT In-House	Contr
	7162		7162		1			
Installation Tech. Rep.	LYMAN E G						X	X
Contractor	BATTELLE MEMORIAL	Location of work	OHIO					
Task Status	NEW	FY 63 Man Yrs	Prof	1.	Tot	3.		

23-77-770-100-53-01-02 Integrated Advanced Life Support System —Lan

Perform the advanced research and technology required in the proof of concept of an advanced life support system that includes the following aspects: environmental and atmospheric control, food and water, and hygienic and sanitation criteria.

Task Form 1st Dates Issue			Curr Issue		Est Task Compl		EFFORT In-House	Contr
	7162	→	4163		1			
Installation Tech. Rep.	STONE R W JR						X	X
Contractor	GENERAL DYNAMICS	Location of work	CAL					
Task Status	REPLA	FY 63 Man Yrs	Prof	3.	Tot	4.		

10-77-770-100-53-01-03 Parameters Essential for Manned Flight Operation —Hdqt

To investigate parameters essential for Manned Flight Operation. (Elevated CO_2 concentration, water loss of man, effects of 100% O_2, gas rate of exchange in a sealed space cabin, gas chromatography, analysis of trace atmospheric contaminants).

Task Form 1st Dates Issue			Curr Issue		Est Task Compl		EFFORT In-House	Contr
	1163		1163		1			
Installation Tech. Rep.	VORIS F							X
Contractor	USAF SCH OF AERO MED	Location of work	TEX					
Task Status	NEW	FY 63 Man Yrs	Prof	.	Tot	.		

21-77-770-100-53-01-03 Closed Life Support System Optimization Studies —Amos

It is the purpose of this task to perform optimization studies on life support systems. Evaluation will be based on mission duration, system weights, and power requirements. Consideration will be given to chemical and biological means of life support management.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT InHouse	Contr
Installation Tech. Rep.	LYMAN E G					X	
Task Status	NEW	FY 63 Man Yrs		Prof	1.	Tot	2.

10-77-770-100-53-01-04 Integrated Human Maintenance Subsystem —Hdqt

The contractor will design, fabricate and test the following complete environmental subsystem in a Humidity and temperature controlled chamber: 1) Respirator System; 2) Waste handling system; 3) water recovery system; 4) food supply; 5) wash water system.

Task Form 1st Dates Issue	1 2 62	Curr Issue	1 2 62	Est Task Compl		EFFORT InHouse	Contr
Installation Tech. Rep.	DEL DUCA M G						X
Contractor	BOEING CO			Location of work	WASH		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-77-770-100-53-01-04 Effects of High Oxygen Tensions on Central Nervous System —Ames

To study the effects of high oxygen tensions on the central nervous system by studying the effects of O_2 on the structure of cell and tissue membranes.

Task Form 1st Dates Issue	3 1 63	Curr Issue	3 1 63	Est Task Compl		EFFORT InHouse	Contr
Installation Tech. Rep.	FUGITT C H						X
Contractor	TEL HASHOMER			Location of work	ISRL		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

10-77-770-100-53-01-05 CO_2 Reduction System —Hdqt

Contractor will design, fabricate and operate an open cycle carbon dioxide reduction unit.

Task Form 1st Dates Issue	1 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT InHouse	Contr
Installation Tech. Rep.	DEL DUCA M G						X
Contractor	THOMSON RAMO WOOLD			Location of work	OHIO		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

10-77-770-100-53-01-06 Use of Ozonides for Air Revitalization —Hdqt

Contractor will optimize the processes for the synthesis of low molecular weight alkali metal ozonides as to purity, yield, and stability; and shall conduct studies of the initiation and control of reactions between ozonides and water vapor, thermal stabilities, and decomposition products as well as heats of reaction and melting point temperatures.

Task Form 1st Dates Issue	8 1 62	Curr Issue	8 1 62	Est Task Compl		EFFORT InHouse	Contr
Installation Tech. Rep.	VQRIS F B						X
Contractor	GENERAL DYNAMICS			Location of work	CONN		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

10-77-770-100-53-01-07 Metallic Superoxides —Hdqt

The contractor shall prepare design drawings of an engineering model micro-contractor that will utilize high density metallic superoxides to revitalize sealed cabin breathing atmospheres, and, after approval, will fabricate and test the system.

Task Form 1st Dates Issue	8 1 62	Curr Issue	8 1 62	Est Task Compl		EFFORT InHouse	Contr
Installation Tech. Rep.	VQRIS F B						X
Contractor	GENERAL DYNAMICS			Location of work	CONN		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

03 WASTE DISPOSAL TASK AREA

10-77-770-100-53-03-01 Bioelectrochemistry —Hdq

To study fundamental bio-electrochemistry (by Ford), ap plied bio-electrochemistry (by Magna), and to develop a biochemical fuel cel (marquardt).

Task Form 1st Dates Issue	6 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT InHouse	Contr
Installation Tech. Rep.	COHN E M						X
Contractor	FORD MOTOR CO			Location of work			
Contractor	MAGNA CORP			Location of work	CAL		
Contractor	MARQUARDT CORP			Location of work	CAL		
Task Status	REPLA	FY 63 Man Yrs		Prof	.	Tot	.

21-77-770-100-53-03-01 Design Construction and Test of an Integrated Huma Maintenance Subsystem —Ame

To undertake a program of studies leading to the desig fabrication, and test of an integrated system capable of providing adequate lif support for five men for a thirty-day period.

Task Form 1st Dates Issue	8 1 63	Curr Issue	8 1 63	Est Task Compl		EFFORT InHouse	Cont
Installation Tech. Rep.	FUGITT C H						X
Contractor	BOEING CO			Location of work	WASH		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

77 HUMAN FACTORS SYSTEMS PROGRAM
770 Director of Biotechnology and Human Research
53 Life Support Sub-program

04 PROTECTIVE DEVICES TASK AREA

21-77-770-100-53-04-01 Improvement of the Ames Support and Restraint System —Ames

Modifications of the Ames Physical Support and Restraint System in order to improve this system are necessary in order to increase the scope of its use from present motion flight simulators to a flight article. These include reduction in weight and bulk, better articulation and integration of this article with the full pressure suit. It is also desired to study its impact capability.

Testing would have to be conducted at such facilities as the Daisy Track, Holoman AFB, the Impact Acceleration Device Aero Med Laboratory, Wright-Patterson AFB, Ohio and the Johnsville Centrifuge.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	VYKUKAL H C					X	
Task Status	NEW	FY 63 Man Yrs		Prof	2	Tot	10

21-77-770-100-53-04-02 Anthropometric Devices for Planetary Exploration —Ames

The objective of this task is to conduct investigations that will lead to the specifications required for anthropometric devices needed in planetary exploration by defining the environment as well as possible methods of solution to the problems posed.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	LYMAN E G					X	X
Contractor	INTERNAT LAYTEX	Location of work	DEL				
Contractor	IIT RES INSTITUTE	Location of work	ILL				
Task Status	NEW	FY 63 Man Yrs		Prof	.5	Tot	2

05 SYSTEMS STUDIES TASK AREA

10-77-770-100-53-05-01 Miniaturized TV Camera —Hdqt

To conduct a design study, design, fabricate, & test and deliver a miniaturized TV camera with a self contained power source and requiring no interconnecting cables between the TV camera and monitor.

Task Form 1st Dates Issue	10 1 62	Curr Issue	10 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	DEL DUCA M G						X
Contractor	AMELCO INC	Location of work					
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

06 BIOENGINEERING TASK AREA

10-77-770-100-53-06-01 Bio-Electrogenesis —Hdqt

In a Bioelectrogenic System: 1) To study the mechanisms by which the energy is produced; 2) To verify the role of metabolites in production of energy; 3) Selection of biological organisms to produce optimum output; 4) Measure and computation of Faradaic Efficiency; 5) To study & select optimum membrane & electrode systems; 6) Assembly & test of optimum Bio-Electrogenic System.

Task Form 1st Dates Issue	6 1 62	Curr Issue	6 1 62	Est Task Compl	5 1 64	EFFORT In-House	Contr
Installation Tech. Rep.	DEL DUCA						X
Contractor	GENERAL ELECTRIC CO	Location of work	PENN				
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-77-770-100-53-06-01 Arterial Pulse Pressure Ear Oximeter Telemetry —Ames

To provide a transducer with a telemeter system for the measurement of blood oxygen saturation and some indication of relative changes in arterial blood pressure for use on motion flight simulators, aircraft, and laboratory exercise equipment.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl	7 1 64	EFFORT In-House	Contr
Installation Tech. Rep.	SMITH J R JR					X	
Task Status	NEW	FY 63 Man Yrs		Prof	.5	Tot	1

24-77-770-100-53-06-01 Psychophysiological Information Acquisition Processi and Control System (PIAPACS) —FR

To advance the state of the art in biotechnology an human research by procuring a Psychophysiological Information Acquisition Pr cessing and Control System (PIAPACS). To maintain, operate and modify PIAPAC as required to conduct experiments to yield information vital to life and pr

tective systems as applicable to laboratory, simulator and in-flight regimens f determination of the man-machine-environment interrelationship. This task w be coordinated with Hq.

Task Form 1st Dates Issue	6 1 62	Curr Issue	> 4 1 63	Est Task Compl		EFFORT In-House	Cont
Installation Tech. Rep.	BRANT J W A					X	X
Contractor	LEAR SIEGLER INC	Location of work	CAL				
Contractor	NORTH AMERICAN AVIA	Location of work	LA				
Task Status	PEPLA	FY 63 Man Yrs		Prof	.6	Tot	.6

10-77-770-100-53-06-02 Photosynthetic Gas Exchanger —HQ

To modify the existing photosynthetic gas exchanger a operate it in extended factorial experiment and under established optimum con tions using recycled medium supplemented with processed human waste; desi and fabricate two ten-liter fermentor vessels and a suitably sized primate chamb and an intermediate carbon dioxide concentrator for closed cycle operation wi the modified exchanger for future studies; conduct bacteriological analyses algae cultures and growth studies at high intensity with selected algae strai

Task Form 1st Dates Issue	12 1 62	Curr Issue	12 1 62	Est Task Compl		EFFORT In-House	Con
Installation Tech. Rep.	VORIS F B						X
Contractor	GENERAL DYNAMICS	Location of work	CONN				
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-77-770-100-53-06-02 Study and Evaluation of Psychophysiological Monitori Techniques for Use in Advanced Aerospace Missions —Am

Work performed under this task will be concerned wi monitoring human physiological responses as a function of various environment conditions expected on advanced aerospace missions. Techniques will be develope to permit continuous monitoring while subjects are engaged in the performanc of mission tasks under a high degree of simulation of actual mission condition Of primary interest will be such measures as EEG, EKG and respiratory a circulatory measures under such stresses as extremes of acceleration (high a zero-G) and reduced sensory input. An integral part of the investigations will b an attempt to improve the techniques of analysis of such data by digital comput methods.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In-House	Con
Installation Tech. Rep.	MATTER M					X	
Task Status	NEW	FY 63 Man Yrs		Prof	1.	Tot	2

10-77-770-100-53-03-03 Human Factors Bioinstrumentation —Hdqt

1) Chronic and continuous measurement of blood flow; 2) Chronic and continuous measurement of intracardiac and intravascular pressure; 3) Continuous measurement of oxygen saturation of arterial and venous blood in intact aorta and pulmonary artery; 4) Implantation techniques for resistance to time, vibration and gravitational stresses.

Task Form 1st Dates Issue	2 | 63	Curr Issue	2 | 63	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	DEL DUCA M G						X
Contractor	COLUMBIA UNIV			Location of work	NY		
Task Status	NEW	FY 63 Man Yrs	Prof	.	Tot	.	

21-77-770-100-53-03-03 Biological Design Studies of Man —Ames

A study of man in an extraterrestrial environment, concerned with the system requirements for the optimum spacecraft configuration design which will insure the safety and continued contribution of man to extra-terrestrial and space explorations.

Task Form 1st Dates Issue	5 | 63	Curr Issue	5 | 63	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	FUGITT C H						X
Contractor	UNITED AIRCRAFT COR			Location of work	CONN		
Task Status	NEW	FY 63 Man Yrs	Prof	.	Tot	.	

07 PERSONNEL EQUIPMENT TASK AREA

10-77-770-100-53-07-01 Evaluation of Control Display Parameters —Hdqt

An evaluation of control display parameters by measures of human performance during positive transverse acceleration will be made by means of experiments on the human centrifuge and the simulation of flight control display dynamics using analog techniques.

Task Form 1st Dates Issue	6 | 61	Curr Issue	6 | 61	Est Task Compl	1 | 62	EFFORT In-House	Contr
Installation Tech. Rep.	VORIS F						X
Contractor	DOUGLAS AIRCRAFT CO			Location of work	CAL		
Task Status	NEW	FY 63 Man Yrs	Prof	.	Tot	.	

24-77-770-100-53-07-01 Research on Self-Powered Metabolic Systems —FRC

Develop an ultra-light-weight, self-powered, miniaturized and personalized metabolic system to analyze and control the gases which man working in aerospace environments requires to meter his intake and measure quantitatively his inspired and expired respiratory gases as well as indicate volumetrically the supply of these gases. Study requirements for such a system will be accomplished prior to a contract for equipment. This will be coordinated with Hq. prior to release of contracts.

Task Form 1st Dates Issue	6 | 62	Curr Issue	4 | 63	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	BRANT J W					X	
Task Status	REPLA	FY 63 Man Yrs	Prof	2	Tot	3	

10-77-770-100-53-07-02 Evaluation of Control-Display Parameters —Hdqt

Supplemental funding for BG-1893 to cover rising costs since initial approval of the program.

Task Form 1st Dates Issue	3 | 62	Curr Issue	3 | 62	Est Task Compl	9 | 62	EFFORT In-House	Contr
Installation Tech. Rep.	BOHLING R F						X
Contractor	DOUGLAS AIRCRAFT CO			Location of work	CAL		
Task Status	NEW	FY 63 Man Yrs	Prof	.	Tot	.	

87 BIOSCIENCE PROGRAM
870 Director of Bioscience Programs
52 Behavioral Biology Sub-program

01 EFFECTS OF THE SPACE ENVIRONMENT ON BEHAVIOR TASK AREA

21-87-870-100-52-01-01 Behavioral Effects of Rotation and Acceleration —Ames

This task will include exploratory experiments on the effects of prolonged exposure to rotation and acceleration on behavioral functions of infra-human organisms.

Task Form 1st Dates Issue	7 1 6 2	Curr Issue	7 1 6 2	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	WEISSMAN N					X	X
Contractor	NOT REPORTED			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	.5	Tot	1.

21-87-870-100-52-01-02 Neuroendrocrinological Aspects of the Inter-relationships Between Biological Rhythms and the Stresses of Space Flight —Ames

(1) To establish normal patterns of rhythms such as body temperature, voluntary running activity, osmolarity of urine, and the estrous cycle in female rats and then subject these animals to physical stress (centrifugation, vibration, heat and cold, etc.). The effect of stress on the rhythms and the ability of the rhythms to adapt to chronic stress will be studied. (2) To investigate the effect of disturbed rhythms on survival and health of such animals as rats and monkeys. This will consist of determinations of blood corticoids, blood glucose, eosinophiles, electrolytes, etc.

Task Form 1st Dates Issue	7 1 6 2	Curr Issue	7 1 6 2	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	GRINDELAND R					X	
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

02 NEUROLOGICAL & BIOCHEMICAL BASES OF BEHAVIOR TASK AREA

21-87-870-100-52-02-01 Physiology of Vestibular Nuleeus —Ames

The vestibular nucleus has anatomical connections with structures concerned with varied actions both autonomic and voluntary. In the autonomic realm it has —bera to the nucleus of the vagus, the Edinger Westphal, the reticular substance, the archicerebellum, the limbic system, etc. Stimulation techniques will help to map out these connections and its actions. Information obtained from these experiments is basic for the evaluation of the influence of motion-stress in space flights on the central nervous system, with particular reference to motion sickness.

Task Form 1st Dates Issue	7 1 6 2	Curr Issue	7 1 6 2	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	HUERTAS J					X	
Task Status	NEW	FY 63 Man Yrs		Prof	1.	Tot	2

21-87-870-100-52-02-02 "End Points" in Neural Organization —Ames

To provide new and improved models of neural mechanisms controlling posture and locomotion necessary for the design of meaningful physiological experiments.

Task Form 1st Dates Issue	7 1 6 2	Curr Issue	7 1 6 2	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	MEHLER W					X	
Task Status	NEW	FY 63 Man Yrs		Prof	1.	Tot	2

21-87-870-100-52-02-03 Vestibular Brain Mechanisms —Ames

To analyze the CNS pathways which project upon the vestibular system and other anatomical substrata of functionally related brain mechanisms.

Task Form 1st Dates Issue	7 1 6 2	Curr Issue	7 1 6 2	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	MEHLER W					X	X
Contractor	NOT REPORTED			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	1.	Tot	2.

21-87-870-100-52-02-04 Biochemical-Electrical Interrelationships in Simple Biological Information Storage Systems —Ames

Methods will be devised to implant microelectrodes into planaria ganglia, either in vivo or in vitro. The effects of stimulation of a variety of types on the ability of these structures to incorporate and metabolize radioactive precursors of the nucleic acids and proteins will be determined. In addition, the effects of stimulation on utilization of energy rich compounds will be determined. (Ultimately, the enzymatic systems involved will be isolated and characterized).

Task Form 1st Dates Issue	7 1 6 2	Curr Issue	7 1 6 2	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	SHAPIRA J					X	
Task Status	NEW	FY 63 Man Yrs		Prof	1.3	Tot	1.3

03 BIOLOGICAL INFORMATION, CONTROL, & COMMUNICATION SYSTEMS TASK AREA

10-87-870-100-52-03-03 Support of A Computer Technology Center for Research on MNC Computers —Hdqt

To do research and development on MNC computers.

Task Form 1st Dates Issue	1 2 1 6 2	Curr Issue	1 2 1 6 2	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	GLASSMAN						X
Contractor	NAT INSTITUTE HEALT			Location of work	MD		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

04 EXPERIMENTAL ANALYSIS OF BEHAVIOR TASK AREA

21-87-870-100-52-04-01 Learning and Discrimination of Probability Schedule —Ames

To investigate the capabilities of subhuman animals in functioning as statistical analyzers when confronted with a choice situation where one of a number of alternatives may be correct. Which alternative is correct varies from trial to trial according to predetermined probability schedules. The demand on the organism in estimating which of the alternatives will be correct is twofold. He must combine the information received in the outcomes of his previous trials in such a manner as to arrive at a useful average value for each alternative. Secondly, on any one trial he must make a decision based on these average values derived from previous experience. In performing this task, the animal is thus being asked to act as a computer, i.e., to integrate over previous outcomes. This type of behavior represents a direct and empirical attempt to obtain insight into how cybernetics principles can be applied to the study of behavior, and the close resemblance it bears to actual in-flight performance demands on human operators. In arriving at this average value the operator must function as a probability statistic, the same as the animal is asked to do in the experimental situation. It will be important to first of all establish the techniques and methodology for presenting this problem so that the underlying variables can be analyzed quantitatively and varied in as controlled a way as possible. Once this capability has been achieved it will be possible to investigate some aspects of this process which have until now gone untouched.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl	6 1 63	EFFORT In-House	Contr
Installation Tech. Rep.	BEASLEY J					X	X
Contractor	NOT REPORTED			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	1.	Tot	1.

21-87-870-100-52-04-02 Environmental Determinants of Behavior —Ames

The purpose of this research will be to investigate the effects of temperature and humidity as paramentric determinants of behavioral functions. The discriminating and reinforcing functions of temperature and humidity will be explored. In addition the optimal temperature/humidity ranges for various behavioral functions will be determined.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	VERHAVE T					X	
Task Status	NEW	FY 63 Man Yrs		Prof	.5	Tot	1.5

10-87-870-100-52-04-03 Circadian Rhythms in Man Under Controlled Environmental Conditions —Hdqt

The investigation in man of circadian rhythms and zeitgaber stimulation.

Task Form 1st Dates Issue	1 1 63	Curr Issue	1 1 63	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	JACOBS G						X
Contractor	MAX PLANCK INSTITUT			Location of work	GERM		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-87-870-100-52-04-03 Control of Complex Behavior in Infra-Human Organisms —Ames

To extend experimental control over a total primate behavioral repertory. The task involves providing all requirements for maintenance of stable behavior in one or two subjects confined in a small chamber for periods of one year or more.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	WEISSMAN N					X	X
Contractor	NOT REPORTED			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	1.	Tot	2.

21-87-870-100-52-04-05 Development of an Empirical Calculus of Reinforcement Value —Ames

The aim of this research program will be to develop techniques and procedures to calibrate reinforces. Schedules of reinforcement, amount, and duration of reinforcement, as well as the nature of the reinforcer itself, will be manipulated. A study will be made of the way in which these variables effect a quantitative index of relative reinforcement value previously developed by the principal investigated. Parametric studies of selected experimental variables will be made.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	VERHAVE T					X	
Task Status	NEW	FY 63 Man Yrs		Prof	.5	Tot	1.

54 Environmental Biology Sub-program

01 DEVELOPMENT OF EXPERIMENTS FOR STUDIES OF SPACE FLIGHT

ENVIRONMENTAL EFFECTS ON ORGANISMS TASK AREA

10-87-870-100-54-01-03 Study on Effect of Weightlessness on Photosynthes —Hd

To determine the effect of weightlessness on photosy thesis of Chlorella algae. This is related to use of a photosynthetic gas exchang system in space travel and stations.

Task Form 1st Dates Issue	2 1 63	Curr Issue	2 1 63	Est Task Compl	10 1 63	EFFORT In-House	Cont
Installation Tech. Rep.	JENKINS D W						X
Contractor	MINNESOTA UNIV OF			Location of work	MINN		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

10-87-870-100-54-01-04 Program of Research in Space Genetics —Hd

To determine the effects of space radiation on mutatio of Neurospora fungi. Flight experiments will better define the biological effects space radiation.

Task Form 1st Dates Issue	2 1 63	Curr Issue	2 1 63	Est Task Compl	8 1 63	EFFORT In-House	Cont
Installation Tech. Rep.	JENKINS D W						X
Contractor	FLORIDA STATE UNIV			Location of work	FLA		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

33-87-870-100-54-01-04 Tissue Equivalent Dosimeter Feasibility Study —J

To develop a lightweight, reliable dosimeter for use space probes to study the radiation hazard to manned space flight. At prese it is felt that a possible system would use a plastic scintillator with suitab output circuitry. Other systems will be studied.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In-House	Cont
Installation Tech. Rep.	WASHBURN H W					X	
Task Status	NEW	FY 63 Man Yrs		Prof	.4	Tot	.7

87 BIOSCIENCE PROGRAM
870 Director of Bioscience Programs
54 Environmental Biology Sub-program

10-87-870-100-54-01-05 Study of the Use of Fungal Luminescence as a Physiological Index —Hdqt

To study the feasibility of recording the intensity of fungal luminescence as a reliable index in space biological studies.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
2 1 63	2 1 63	4 1 63		
Installation Tech. Rep. JENKINS D W				X
Contractor AVCO CORP		Location of work MASS		
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-87-870-100-54-01-05 Instrumentation of Small Animals for Radiation Detection —Ames

To develop new techniques whereby animals can be instrumented for the detection of administered isotopes.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 1 62	7 1 62	1		
Installation Tech. Rep. SCHIEFMAN			X	X
Contractor NOT REPORTED		Location of work		
Task Status NEW	FY 63 Man Yrs	Prof 1,5	Tot 2	

10-87-870-100-54-01-06 Growth Patterns of Plants in the Absence of Gravity Effects —Hdqt

To determine the effects of zero gravity on the growth patterns and movements of plants. This will develop into flight experiments of effects of 0 g on plant morphogenesis.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
2 1 63	2 1 63	9 1 64		
Installation Tech. Rep. JENKINS D W				X
Contractor DARTMOUTH COLL		Location of work NH		
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

10-87-870-100-54-01-07 Life Sciences Instrumentation —Hdqt

Research into effective measurement, systems and system concepts for immediate application in circadian rhythm studies with small mammals and Drosophila and for future application as needed.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
1 1 63	1 1 63	1		
Installation Tech. Rep. JACOBS G				X
Contractor FRANKLIN INST		Location of work PENN		
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

10-87-870-100-54-01-08 A Workship on Biotelemetry —Hdqt

To support a workshop on biotelemetry so that biological scientists can be given better insight into uses of this type of instrumentation.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
1 1 63	1 1 63	1		
Installation Tech. Rep. JACOBS G				X
Contractor AIBS		Location of work DC		
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

02 GROUND STUDIES OF SPACE FLIGHT ENVIRONMENTAL EFFECTS ON ORGANISMS TASK AREA

21-87-870-100-54-02-01 Effects of Low Magnetic Fields on Living Material —Ames

To study the effects of controlled magnetic fields lower than the earth's magnetic field on: (a) survival; (b) growth; and (c) metabolism. The ultimate objective is to have no magnetic field. A laboratory space will have the earth's magnetic field shielded out by self-regulating Helmholtz coils, so that magnetic fields down to 10^{-4} to 10^{-5} gauss will be available. Special non-magnetic microscopes and instruments will be used so as to introduce no extraneous magnetic fields into this environment. Long and short-term measurements will be made. Plant material will be used (such as the fungus Phycomyces), microorganisms such as the amos and other protozoa, and developing embryonic material such as the sea urchin and egg. Higher animals such as the mouse will also be studied in such an environment for physiological effects or changes in rhythmicity.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 1 62	7 1 62	1		
Installation Tech. Rep. YOUNG R S			X	
Task Status NEW	FY 63 Man Yrs	Prof 1,5	Tot 1,8	

10-87-870-100-54-02-02 Effects of Very Strong Magnetic Fields and of Magnet Field-free Environments on Animals and Man —Hdqt

To study the effects of high and low magnetic fields on animals and human beings.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
2 1 63	2 1 63	8 1 64		
Installation Tech. Rep. JENKINS D W				
Contractor US NAV SCH AVIAT MED		Location of work FLA		
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-87-870-100-54-02-02 Amelioration of Radiation Effects by Dietary Control—Ames

Exposure to sub-lethal doses of ionizing radiation result in changes in excitability of the Central Nervous System. Earlier studies have shown that single exposures to 250 or 500 result in a decreased threshold for electrically induced convulsions. Pre-feeding diets high in carbohydrate aggravated the symptoms; pre-feeding a diet high in protein tended to reduce the distortions.

Contractor shall conduct tests with a view towards determining the relationships between nutritional status, age, sex, and chronic and acute exposures to sub-lethal doses of ionizing radiation.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 1 62	7 1 62	1		
Installation Tech. Rep. YOUNG D R			X	X
Contractor NOT REPORTED		Location of work		
Task Status NEW	FY 63 Man Yrs	Prof ,3	Tot ,3	

21-87-870-100-54-02-03 Effect of High Magnetic Field on Living Material —Ames

To study the effects of controlled magnetic fields (normal to 30,000 gauss) on: (a) survival; (b) growth; and (c) metabolism. The emphasis is on controlled conditions and analysis of response. Developing embryonic material will be stressed. Combination of factors (gravity, light, radiation, etc.) will be used. The sea urchin egg and the fungus Phycomyces will be used primarily. Both short and long-term exposures will be made in a carefully-controlled environment. The temperature between the poles of the magnet will be carefully controlled as well as the light source. Special (non-magnetic) microscopes are being constructed for use between the poles of the magnet, so that the material may be observed while in the magnetic field.

Task Form 1st Dates Issue	7162	Curr Issue	7162	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	YOUNG R S					X	X
Contractor	NOT REPORTED			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	.2	Tot	2.5

21-87-870-100-54-02-05 Radiation Protection by Alteration of G-I Function —Ames

Breakdown in cell permeability, massive hemorrhaging, and invasion of the body by intestinal bacteria is an earlier sequel to radiation exposure. Studies with animals have shown that increasing the mass of intestinal mucosa by pre-feeding a diet high in bulk (roughage or inert clay) protects against the "intestinal phase" of radiation deaths and increases the tolerance to lethal exposures by a factor of 15 percent. Further studies are required to evaluate more fully the protective changes associated with proliferation of the intestinal mucosa. Contractor shall conduct studies with a view towards determining the relationship between gastro-intestinal function and radiation effects. Studies shall include tests of digestion and absorption of foods and the secretory function of the digestive tract all in relationship to radiation protection.

Task Form 1st Dates Issue	7162	Curr Issue	7162	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	YOUNG D R					X	X
Contractor	NOT REPORTED			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	.3	Tot	.3

21-87-870-100-54-02-06 Study Long-term Effects of Low G-loading on Plants—Ames

To study the effects of 1-10 G's in a specially constructed centrifuge on (a) viability, (b) gross morphology, (c) reproducibility, (d) metabolism, and (e) growth. The fungus Phycomyces will be used because of its demonstrated gravity sensitivity. It has also been demonstrated to have a great sensitivity to light and radiation so that it will be used in studying combination effects. Generations of Phycomyces and other plants will be raided in the centrifuge to study adaptations to this environment.

Task Form 1st Dates Issue	7162	Curr Issue	7162	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	OYAMA J					X	
Task Status	NEW	FY 63 Man Yrs		Prof	1.	Tot	1.5

10-87-870-100-54-02-07 Research on Pathogen Free Plants in a Microcosm & on the Effect of High Intensity Light on Plant Growth —Hdqt

To study the effects of high light intensity on photosynthesis and methods for decontamination and growth of pathogen free plants. This work is related to gas exchangers and food supply systems in space travel.

Task Form 1st Dates Issue	7161	Curr Issue	2163	Est Task Compl	12165	EFFORT In-House	Contr
Installation Tech. Rep.	JENKINS D W						X
Contractor	COLORADO STATE UNI			Location of work	COLO		
Task Status	REPLA	FY 63 Man Yrs		Prof	.	Tot	.

21-87-870-100-54-02-08 Study Long-term Effects of Low G-loading on Single-celled Systems —Ames

To study the effects of 1-10 G's in a specially constructed centrifuge on: (a) viability, (b) gross morphology, (c) reproducibility, (d) metabolism, and (e) rhymicity. Effects of combinations of such things as light, temperature, atmospheric pressure, etc. will be studied in combination with G-loading. Developing embryonic systems such as the frog egg and sea urchin egg will be used, as well as protozoa such as amoeba and paramecium. Organisms with known gravitational response (frog egg) will be stressed.

Task Form 1st Dates Issue	7162	Curr Issue	7162	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	OYAMA J					X	
Task Status	NEW	FY 63 Man Yrs		Prof	1.5	Tot	2.

21-87-870-100-54-02-09 Study the Direct Effects of Alpha Particle Radiation on the Rat Brain —Ames

Study of the direct effects of irradiation with Alpha particles from the 60 inch Berkeley cyclotron on the metabolism of the brain.

Task Form 1st Dates Issue	7162	Curr Issue	7162	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	MIGUEL J					X	X
Contractor	CALIF UNIV OF			Location of work	CAL		
Task Status	NEW	FY 63 Man Yrs		Prof	3.	Tot	4.

10-87-870-100-54-02-10 Individualized, Chemically-Defined Diets in Life Support Systems During Space Flight —Hdqt

The objectives of this research is to study dietary requirements of man and using man as a test animal, employing water-soluble, chemically-defined diets.

Task Form 1st Dates Issue	10162	Curr Issue	10162	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	JACOBS G J						X
Contractor	CITY OF HOPE HOSP			Location of work	CAL		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-87-870-100-54-02-10 Biological Effects of Ground Based Ionizing Radiation (X-rays) —Ames

Search for new methods for detection of radiation injury at the histochemical level. Before the damage can be detected by morphological alterations of the tissue elements.

Task Form 1st Dates Issue	7162	Curr Issue	7162	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	MIGUEL J					X	
Contractor	NOT REPORTED			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	1.	Tot	2.

87 BIOSCIENCE PROGRAM
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02 GROUND STUDIES OF SPACE FLIGHT ENVIRONMENTAL EFFECTS

10-87-870-100-54-02-11 To Investigate the Use of Perognathus as An Experimental Organism for Space Biology Research —Hdqt

To study the possibilities of using perognathus as an animal for research in space biology. The pocket mouse has been used as an indicator of the biological fate of radio active residues in areas adjacent to the Nevada test site and additional studies have endorsed the initial use of the pocket mouse for biological research in space.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
1 | 63	1 | 63			
Installation Tech. Rep. JACOBS G J				X
Contractor NORTHRUP SPACE LABS Location of work CAL				
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-87-870-100-54-02-11 Effects of Simulated Extraterrestrial Conditions on Somatic Mitosis and/or Mutation Rate —Ames

To develop basis for prediction of effects of extraterrestrial conditions on somatic mitosis and/or mutation rate, using morphologic and quantitative chemical observations on the genetic material of avian and mammalian cells, from experimentally prepared animals.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 | 62	7 | 62	65		
Installation Tech. Rep. CONLEY C C			X	X
Contractor CALIF UNIV OF Location of work CAL				
Task Status NEW	FY 63 Man Yrs	Prof 1.	Tot 1.	

10-87-870-100-54-02-12 Freezing and Drying of Living Cells —Hdqt

Investigation of hypothermia for an understanding of the mechanism by which it injures living cells.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
1 | 63	1 | 63			
Installation Tech. Rep. JACOBS G J				X
Contractor NMRI Location of work MD				
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-87-870-100-54-02-12 Effect of Space Voyage Stress on Synthatic Metabolic Processes —Ames

The purpose of this task is to determine whether the stresses imposed by space voyages (G-forces, weightlessness, vibration) on experimental animals (rats, rabbits, monkeys, dogs) have an effect upon the synthetic metabolic activity of isolated organs and tissues. Tissues such as a liver will be removed from stressed animals so that their metabolic activity can be assessed by in vitro techniques.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 | 62	7 | 62			
Installation Tech. Rep. FELLER D D			X	
Task Status NEW	FY 63 Man Yrs	Prof 1.	Tot 2.	

10-87-870-100-54-02-13 Interdisciplinary Studies of the Effects of Space Environments on Biological Systems —Hdqt

To conduct research into effects of altitude, rare gases, exirridiation and assimilated space conditions on biological systems.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
1 | 63	1 | 63			
Installation Tech. Rep. JACOBS G				X
Contractor OKLAHOMA CITY UNIV Location of work OKLA				
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-87-870-100-54-02-13 Nucleatide variations of certain tissues in Response to Some Environmental Alterations —Ames

To assay for acid soluble nucleotides (high energy compounds) in selected tissues of the animal body and thus determine the level and distribution of the high energy phosphate compounds adenosine mono-, di-, and tri-, phosphates which are intimately concerned with energy metabolism. After baselines have been established, dynamic changes in these compounds will be followed during different environmental alterations.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 | 62	7 | 62			
Installation Tech. Rep. LEON H A			X	
Task Status NEW	FY 63 Man Yrs	Prof 1.	Tot 2.	

10-87-870-100-54-02-14 Biological Effect of Chronic Exposure to Artificial Atmospheres —Hdqt

Investigation of the effects of prolonged exposure of small mammals to closed gaseous environments low in nitrogen.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
1 | 63	1 | 63			
Installation Tech. Rep. JACOBS G J				X
Contractor OHIO STATE UNIV Location of work OHIO				
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-87-870-100-54-02-14 Protein Synthesis of Different Tissues of the Rat I Response to Various Corticoids —Ame

To see if tissues of the body demonstrate a polyphasi response to adreno-corticoids as has been shown for liver when protein synthesi is used as the means of evaluation. As a consequence the stress situation can b better defined with respect to this parameter.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 | 62	7 | 62			
Installation Tech. Rep. LEON H A			X	
Task Status NEW	FY 63 Man Yrs	Prof 1.	Tot 2.	

10-87-870-100-54-02-15 Development of a Superior Diet for Man in Space —Hdq

The objective of this contract is to experiment wit chemically-defined diets which include essential and non-essential L Amino acid and various other necessary components (in vitamins, minerals, carbohydrate fats, etc.). These diets will be developed in conjunction with the City of Hop Medical Center, Duarte, California.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	10 | 62	10 | 62	10 | 63		
Installation Tech. Rep.	JACOBS G J				X
Contractor	SCHWARZ BIORESRCH	Location of work	NY		
Task Status	NEW	FY 63 Man Yrs	Prof .	Tot .	

21-87-870-100-54-02-15 Roentgenographic Estimation of Bone Age in the Cynomolgus Monkey —Ames

To determine by x-ray plates, the time of appearance of ossification centers and time of closure of epiphyseal plates in cynomolgus monkeys of known age. The analysis of this data will subsequently be used to estimate ages of captured monkeys to be subsequently used in space biological research programs.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7 | 62	7 | 62			
Installation Tech. Rep.	PARROTT M W			X	X
Contractor	NOT REPORTED	Location of work			
Task Status	NEW	FY 63 Man Yrs	Prof .1	Tot .1	

21-87-870-100-54-02-16 Effects of Simulated Extraterrestial Conditions on Immune Mechanisms —Ames

To determine effects of high energy irradiation, cold and hypoxia on the two major modalities of acquired immune response.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7 | 62	7 | 62	67		
Installation Tech. Rep.	CONLEY C			X	X
Contractor	CALIF UNIV OF	Location of work	CAL		
Task Status	NEW	FY 63 Man Yrs	Prof 2.5	Tot 3.5	

21-87-870-100-54-02-17 Enclosure Monitoring of Fibrinolysis —Ames

To determine the mechanism of activation of plasminogen (thereby leading to fibrinolysis and hemorrhagic tendencies) in blood during the physiological and psychological stresses encountered in the course of space exploration; with particular reference to possible control by the endocrine systems and nervous systems.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7 | 62	7 | 62			
Installation Tech. Rep.	MCDONALD K			X	X
Contractor	NOT REPORTED	Location of work			
Task Status	NEW	FY 63 Man Yrs	Prof 1.	Tot 2.	

03 BIOLOGICAL ANALYSIS OF TERRESTRIAL ENVIRONMENTAL EXTREMES TASK AREA

10-87-870-100-54-03-01 Support of White Mountain Alpine Research Station & Study of the Physiology of Natural High Altitude Hibernating Animals —Hdqt

Detailed physiological studies of the basic mechanisms involved in inducing, maintaining, and terminating hibernation in high altitude natural hibernators. Study of animals and human respiratory, cardiovascular, and [illegible] psycho-physiological studies in relation to effects of high altitude, high ultraviolet and radiation and other environmental factors. Studies on photosynthesis and other processes in alpine plants in relation to studies with planetary simulation.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	2 | 63	2 | 63	12 | 65		
Installation Tech. Rep.	JENKINS D W				X
Contractor	CALIF UNIV OF	Location of work	CAL		
Task Status	NEW	FY 63 Man Yrs	Prof .	Tot .	

04 EFFECTS OF SIMULATED EXTRATERRESTRIAL ENVIRONMENTS ON EARTH ORGANISMS TASK AREA

21-87-870-100-54-04-02 Effects of Simulated Planetary Environment on Earth Organisms —Ames

To stimulate as accurately as possible the environments of planets of interest (Mars and Venus), and to study the effects of such environments on: (a) survival, (b) adaptation, (c) metabolism, and (d) growth. Microorganisms (bacteria, fungi, lichens, algae) from extreme environmental conditions (desert, mountain tops, high salinity waters, polar caps, etc.) on earth will be studied. These will be introduced into a chamber and maintained as such environmental extremes as will be encountered on Mars, for example (—100° C to +30° C; 0.1 atmosphere, no oxygen, high U.V., less than 1% H_2O, etc.). Adaptation of organisms to such environments should yield information as to what types of organisms and metabolic pathways may be sought on extraterrestrial bodies.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	7 | 62	7 | 62			
Installation Tech. Rep.	YOUNG R S			X	
Task Status	NEW	FY 63 Man Yrs	Prof 2.	Tot 3.	

10-87-870-100-54-04-03 Biochemical Activities of Terrestrial Microorganisms in Simulated Planetary Environments —Hdqt

To study the growth and biochemical activities of terrestrial microorganisms under some of the conditions imposed by primitive and contemporary environments of the terrestrial planets.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	2 | 63	2 | 63	2 | 64		
Installation Tech. Rep.	JENKINS D W				X
Contractor	CALIF UNIV OF	Location of work	CAL		
Task Status	NEW	FY 63 Man Yrs	Prof .	Tot .	

10-87-870-100-54-04-04 Research on Life in Extraterrestrial Environments —Hdq

To determine the types of earth organisms which ca grow and reproduce in simulated Martian environmental conditions.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
	2 | 63	2 | 63	2 | 64		
Installation Tech. Rep.	JENKINS D W				X
Contractor	ARMOUR RES FOUND	Location of work	ILL		
Task Status	NEW	FY 63 Man Yrs	Prof .	Tot .	

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04 EFFECTS OF SIMULATED EXTRATERRESTRIAL ENVIRONMENTS ON

10-87-870-100-54-04-05 Effects of Very Strong Magnetic Fields and of Magnet Field-free Environments on Animals and Man —Hdqt

To study the effects of high and low magnetic fields on animals and human beings.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	EFFORT Contr
2 | 63	2 | 63	8 | 64		
Installation Tech. Rep. JENKINS D W				X
Contractor NOT REPORTED		Location of work		
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

05 STUDIES OF BIOLOGICAL MATERIALS & SYSTEMS FOR USE IN SPACE TASK AREA

10-87-870-100-54-05-01 Physiological Effects of Weightlessness and Space Radiations on Hibernators —Hdqt

To determine the effect of space radiation and zero G on hibernating animals. This work may lead ultimetely to induced use of hibernation of astronauts for protection against radiation.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	EFFORT Contr
2 | 63	2 | 63	5 | 64		
Installation Tech. Rep. JENKINS D W				X
Contractor ST LOUIS UNIV OF		Location of work MO		
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-87-870-100-54-05-03 Incorporation and Metabolism of Nitrogen by Plants —Ames

A study of the processes and pathways of nitrogen incorporation, fixation, and metabolism by plants will be the fundamental objectives of this study. The incorporation and metabolism of inorganic and organic nitrogeneus compounds by plants are influenced by the amount and form in which they are available. The principles of growth and development due to nitrogen will be investigated. Conservation, utilization and recycling of human metabolic products in a closed environment, as in the ecosystem of orbital station or manned bases, relate to this field of study.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	EFFORT Contr
7 | 62	7 | 62	1		
Installation Tech. Rep. YOKOYAMA K			X	
Task Status NEW	FY 63 Man Yrs	Prof 3.5	Tot 3.5	

10-87-870-100-54-05-07 Plant Leaves for the Production of Oxygen in a Closed System —Hdqt

To determine the potentiality of using vascular plants instead of aquatic algae for oxygen production and carbon dioxide utilization for a gas exchanger, and also for food production.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	EFFORT Contr
2 | 63	2 | 63	5 | 63		
Installation Tech. Rep. JENKINS D W				X
Contractor CONN AGRIT EXP STA		Location of work CONN		
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-87-870-100-54-05-07 Comparative Effects of Protons and X-rays on Intestinal Injury and Recovery in the Rat, Dog, Guinea Pig, and Hibernating Mammals —Ames

To compare the effects of protons and X-rays on intestinal injury and recovery in the rat, dog, guinea pig, and hibernating mammals.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	EFFORT Contr
7 | 62	7 | 62	1		
Installation Tech. Rep. TAKETA S R			X	X
Contractor CALIF UNIV OF		Location of work CAL		
Task Status NEW	FY 63 Man Yrs	Prof 4.	Tot 6	

10-87-870-100-54-05-08 Support of White Mountain Alpine Research Station & Study of the Physiology of Natural High Altitude Hibernating Animals —Hdqt

Detailed physiological studies of the basic mechanisms involved in inducing, maintaining, and terminating hibernation in high altitude natural hibernators. Study of animals and human respiratory, cardiovascular, and psycho-physiological studies in relation to effects of high altitude, high ultraviolet and radiation and other environmental factors. Studies on photosynthesis and other processes in alpine plants in relation to studies with planetary simulation.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	EFFORT Contr
2 | 63	2 | 63	12 | 65		
Installation Tech. Rep. JENKINS D W				X
Contractor CALIF UNIV OF		Location of work CAL		
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

10-87-870-100-54-05-11 Utilization of Bio-electric Potentials —Hdqt

To demonstrate the feasibility of utilizing bioelectrical potentials as a primary power source for implanted electronic devices.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	EFFORT Contr
1 | 63	1 | 63	2 | 64		
Installation Tech. Rep. JACOBS G J				X
Contractor NOT REPORTED		Location of work		
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

55 Exobiology Sub-program

01 EVOLUTIONARY & THEORETICAL BIOLOGY TASK AREA

10-87-870-100-55-01-01 Studies of Extremely small self-replicating Systems—Hdqt

To obtain detailed knowledge of cell systems at the extreme limit of small size, i.e., 0.2 microns (1/5 the size of average microorganisms). The observations made will be helpful in determining criteria for what constitutes a living system.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl		EFFORT In-House	Contr
	11 62	11 62				
Installation Tech. Rep.	QUIMBY F H					X
Contractor	YALE UNIV		Location of work	CONN		
Task Status	NEW	FY 63 Man Yrs	Prof	.	Tot	.

10-87-870-100-55-01-03 Studies on the Hill Reaction Activity of Soluble Chloroplast Extracts —Hdqt

To characterize photo-chemically active extracts of chloroplast, to define the components required in the photoactive system and to learn the role of each in the energy transfer process.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl		EFFORT In-House	Contr
	10 62	10 62				
Installation Tech. Rep.	JACOBS G J					X
Contractor	STANFORD RES INST		Location of work	CAL		
Task Status	NEW	FY 63 Man Yrs	Prof	.	Tot	.

10-87-870-100-55-01-04 Molecular Evolution —Hdqt

To produce for the first time "protobiological" systems or precellular chemical systems incapable of reproduction but which may carry out relatively complex metabolic reactions. Materials containing iron or zinc will be introduced into Miller type mixtures in order to make the above required metallo-organic catalysts a possibility.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl		EFFORT In-House	Contr
	11 62	11 62				
Installation Tech. Rep.	QUIMBY F H					X
Contractor	STANFORD UNIV		Location of work	CAL		
Task Status	NEW	FY 63 Man Yrs	Prof	.	Tot	.

21-87-870-100-55-01-04 Synthesis of Protein Microspheres to Serve as A Cell Model for Research on the Origin of Life, etc. —Ames

Synthesis of high molecular weight polypeptide molecules, which on proper treatment gives rise to formed spheres which have many of the properties of cells. Attempt to improve the composition of these microspheres (by incorporation of lipid, poly-saecaride and other complex molecules) in order to make them more and more cell-like, with the ultimate aim of constructing a self-replicating functional unit. Study of primitive earth and extraterrestrial environmental variables (such as gaseous composition and pressure, moisture content, temperature, chemical composition, radiation, etc.) on such synthesis. The use of such cells or cell models to study bioorganic evolution and the origin of life on earth and elsewhere in the universe.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl		EFFORT In-House	Contr
	7 62	7 62				
Installation Tech. Rep.	YOUNG R S				X	
Task Status	NEW	FY 63 Man Yrs	Prof	1.	Tot	1.

10-87-870-100-55-01-05 Microspectrophotometry of Pigments & Organic molecules —Hdqt

To develop and utilize microspectrophotometric instrumentation for the study of pigments and organic molecules within living cells.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl		EFFORT In-House	Contr
	11 62	11 62				
Installation Tech. Rep.	QUIMBY F H					X
Contractor	PITTSBURGH UNIV OF		Location of work	PENN		
Task Status	NEW	FY 63 Man Yrs	Prof	.	Tot	.

21-87-870-100-55-01-06 Chemistry of Formation of Biologically-significant Molecules Under Primitive Earth and Extraterrestrial Conditions —Ames

To study the synthesis of biologically-significant molecules under conditions which may have prevailed on the primitive earth or some other planet. To determine possible pathways of chemical evolution along which life could have arisen.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl		EFFORT In-House	Contr
	7 62	7 62				
Installation Tech. Rep.	PONNAMPERUMA C A				X	
Task Status	NEW	FY 63 Man Yrs	Prof	2.	Tot	2.

21-87-870-100-55-01-07 Properties of Monolayers of Cell Membrane Components at Liquid Interfaces —Ames

To increase the understanding of the type of interaction between various organic compounds, known to be part of cell membranes, within a monolayer and their interaction with the adjacent liquid phases.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl		EFFORT In-House	Contr
	7 62	7 62				
Installation Tech. Rep.	TRUNNIT H J				X	
Task Status	NEW	FY 63 Man Yrs	Prof	1.	Tot	1.

21-87-870-100-55-01-08 Physico-Chemical Properties of Artificial Multilayer Systems —Ames

This study is aimed at the problem of transformation of radiant energy into chemical or electrical energy as exemplified, for example, by the lamellated structure of the chloroplast.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl		EFFORT In-House	Contr
	7 62	7 62				
Installation Tech. Rep.	TRUNNIT H J				X	
Task Status	NEW	FY 63 Man Yrs	Prof	1.	Tot	1.

10-87-870-100-55-01-10 Dynamic Systems Response of the Performance Characteristics of Some Major Biophysical Systems of Interest —Hdq

Study of the physical modeling analysis of the mathematical physical dynamics of major internal human systems. This proposal is directed at four such systems: the thermoregulation system control, the cardiovascular system control, the hormonal signaling system control, the behavioral system response control.

Task Form Dates	1st Issue	Curr Issue	Est Task Compl		EFFORT In-House	Contr
	10 62	10 62				
Installation Tech. Rep.	JACOBS G J					X
Contractor	RAND DEVELOP CORP		Location of work	OHIO		
Task Status	NEW	FY 63 Man Yrs	Prof	.	Tot	.

87 BIOSCIENCE PROGRAM
870 Director of Bioscience Programs
55 Exobiology Sub-program

01 EVOLUTIONARY & THEORETICAL BIOLOGY TASK AREA

21-87-870-100-55-01-10 Effects of Extraterrestrial Conditions on the Metabolism of Tissue Maintained in Culture —Ames

Methods will be developed to maintain human and animal brain tissue in long-term cultures in vitro and these cultures will be used to assess the effects of conditions which exist in space on their metabolism. Radioactively labeled precursors of the nucleic acids and proteins of the tissues will be incubated over prolonged periods and such factors as high magnetic fields, electrostatic fields, gravitational force and the like will be altered. The effects of these forces in combination with various drugs will also be examined.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	SHAPLRO J					X	
Task Status	NEW	FY 63 Man Yrs		Prof	1.8	Tot	1.8

10-87-870-100-55-01-11 Molecular Energetics —Hdqt

To study calirometry of enzyme-coenzyme substrate interactions and dehydrogenase systems and calloremetry of primary steps in photo synthetic carbon dioxide assimilation.

Task Form 1st Dates Issue	1 1 63	Curr Issue	1 1 63	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	JACOBS G J						X
Contractor	NAV MED RESRCH INST	Location of work	MD				
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-87-870-100-55-01-11 Factors Controlling the Formation of Hereditary Materials —Ames

These studies are forerunners to studies of life forms on extraterrestrial bodies in order to understand some of the basic mechanisms involved in the transmittal of hereditary traits from parent to progeny.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	NOT REPORTED					X	X
Contractor	NOT REPORTED			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	1.5	Tot	2

10-87-870-100-55-01-13 Organic Cosmochemistry —Hdqt

To synthesize purines and pyrimidines under possible primitive earth conditions. This is a part of NASA's overall program in evolutionary and theoretical biology aimed at the recapitulation of major chemical events in the origin of life.

Task Form 1st Dates Issue	1 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	QUIMBY F H						
Contractor	HOUSTON UNIV OF			Location of work			TEX
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-87-870-100-55-01-13 A Study of Molecular Structures and Reactions Occurring in Biological Systems Irradiated with Ultraviolet Light —Ames

The mechanism of action of ultraviolet light (UV) on living systems is of special interest in those environments, such as on Mars, where the UV flux is probably quite high, of special interest are those biological systems which can partially reverse these effects. It is proposed that these be studied.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	PAINTER R B					X	
Task Status	NEW	FY 63 Man Yrs		Prof	.5	Tot	.5

10-87-870-100-55-01-14 Space Bioscience Institute —Hdqt

To conduct experiments on the origin of life, molecular evolution, models of Mars and Venus, prepare for analysis of returned samples, develop concepts for detection of life, participate in biological satellite experiments.

Task Form 1st Dates Issue	1 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	QUIMBY F H						X
Contractor	FLORIDA STATE UNIV	Location of work	FLA				
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-87-870-100-55-01-14 Study of Smallest Replicating Units of Heredity —Ames

To determine the chemical character of, the physical structure of, the mode of replication of, and the mechanism of action of bacterial episomes, the smallest known independently replicating genetic units.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	GINOZA H					X	
Task Status	NEW	FY 63 Man Yrs		Prof	1.	Tot	1.

10-87-870-100-55-01-15 Primeval Synthesis of Porphine-like Substances —Hdqt

To synthesize under primitive earth conditions porphine-like substances. Pyrrole and aldehydes will be used as beginning materials and ultra-violet and electrical discharges as a source of energy.

Task Form 1st Dates Issue	1 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	QUIMBY F H						X
Contractor	DETROIT UNIV OF			Location of work	MICH		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-87-870-100-55-01-15 The Mechanism of Radiation-Induced Delay of Cell Division —Ames

These studies are important preliminaries to studying the effects of the radiations of outer space on cell division. Cell division is absolutely required for the proper function of such vital organs as bone marrow, intestinal epithelium and skin, and the action of space radiation on cell division must be better understood before long-range space trips can be undertaken by man.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 1 62	7 1 62			
Installation Tech. Rep. PAINTER R B			X	
Task Status NEW	FY 63 Man Yrs Prof .5	Tot .5		

21-87-870-100-55-01-16 Radiation Effects on Photosynthetic Organisms —Ames

To determine the effects of intense visible light, and ultraviolet light on the photosynthesis and loss of cellular components by photosynthetic organisms. Such studies to be extended to ionizing radiation if possible. To determine environmental extremes (terrestrial and extraterrestrial) suitable for photosynthesis. To determine possible mechanisms of origin of photosynthetic systems.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 1 62	7 1 62			
Installation Tech. Rep. ZILL L P			X	
Task Status NEW	FY 63 Man Yrs Prof 1.	Tot 1.		

21-87-870-100-55-01-17 Lipid Involvement in Photosynthesis —Ames

The objective of this program is: (1) to isolate and chemically characterize the lipid components of organelles which carry on the photosynthesis process; (2) to determine the chemical and physical properties of these lipids as a basis for their involvement in the structures (lamellar) observed in chloroplastic by electron microscopy; (3) to determine the enzymic mechanisms responsible for the anabolic and catabolic reactions of these lipids and their possible participation directly in the photosynthesis process; (4) to study the conjugation of these lipids with proteins as lipoproteins or proteolipids and their role in the structure and function of the chloroplast. To determine the role of photosynthesis in extraterrestrial as well as terrestrial situations.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 1 62	7 1 62			
Installation Tech. Rep. ZILL L P			X	
Task Status NEW	FY 63 Man Yrs Prof 1.	Tot 1.		

10-87-870-100-55-01-18 Reflection Spectra, Meteorite Analysis and Chemical Evolution —Hdqt

To study the nature of reflection spectra as a basis for interpretation of data on extraterrestrial life. To determine the structure and amount of carbon compounds in meteorites, to study Pre-Cambrian rocks with respect to the origin of life and the fate of terrestrial, biological residues and to repeat Miller type experiments using UV energy, followed by identification of resultant compounds by means of paper chromatography and mass spectrometry.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
1 1 62	1 1 62			
Installation Tech. Rep. QUIMBY F H				X
Contractor CALIF UNIV OF	Location of work CAL			
Task Status NEW	FY 63 Man Yrs Prof .	Tot .		

21-87-870-100-55-01-18 Structure of Nucleic Acids of Viruses —Ames

In conjunction with investigations on the effects of radiation on viruses, a more detailed study of the structure of ribonulcleic acid (RNA) and deoxyribonucleic acid (DNA) of viruses will be pursued. It is anticipated that this study, which shall proceed within the context of recent advances in defining the genetic code, will provide information on the exact nature of radiation damage to the genetic apparatus. To develop methods for detection of nucleic acids on extraterrestrial bodies.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 1 62	7 1 62			
Installation Tech. Rep. FROMMHAGEN L H			X	
Task Status NEW	FY 63 Man Yrs Prof 1.	Tot 1.		

10-87-870-100-55-01-19 Evolution of Enzymes on Nucleic Acids —Hdqt

To study the course of evolution of such enzymes as lactic, malic, glutamic, as well as other pyrimidine nucleotide linked dehydrogenases and DNA from the most primitive to the most advanced organisms.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
1 1 62	1 1 62			
Installation Tech. Rep. QUIMBY F H				X
Contractor BRANDEIS UNIV	Location of work MASS			
Task Status NEW	FY 63 Man Yrs Prof .	Tot .		

10-87-870-100-55-01-20 Physics of Cellular Synthesis, Growth and Division —Hdq

To characterize a theoretical basis for the discretion o the processes of synthesis growth and differentiation of a living cell. Research wi be done into the effect of heat on bacterial kinetics, e.g., the effect of growin E. coli at temperatures from 2 to 48 degrees C. on the division rate, uptake o proline, alanine, glucose, uracil, T-32 and S-35, formation of betagalactosidaise an uptake of thymine (for E. Coli 15 T-). Rates of synthesis and pool sizes will b measured. Special attention will be given to the measurement of activatio energies in these processes and relation to reaction kinetics will be stresse The effects of heat and radiation on the lipid spectrum of bacterial membrane and the variation of viscosity of cell extracts and temperatures, the diffusion invertase and ribosomes in E. Coli cell extract and attempts to grow T-1 tha in cell free systems, and the relative time of synthesis of a particular gene.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Con
1 1 63	1 1 63			
Installation Tech. Rep. JACOBS G				X
Contractor PENN STATE UNIV	Location of work PENN			
Task Status NEW	FY 63 Man Yrs Prof .	Tot .		

02 INSTRUMENTATION FOR DETECTION OF EXTRATERRESTRIAL LIFE & LIFE-RELATED COMPOUNDS TASK AREA

10-87-870-100-55-02-01 Cytochemical Studies of Planetary Microorganisms —H

To conduct research, design, and test a miniature b chemical laboratory ("multivator") for the detection and study of extraterrestr life. Also, to study the feasibility of a vidicon microscope for the examination particles or bacteria morphologically with follow-up observations of the parti in the field by spectrophotometry.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Co
1 1 62	1 1 62			
Installation Tech. Rep. QUIMBY F H				X
Contractor STANFORD UNIV	Location of work CAL			
Task Status NEW	FY 63 Man Yrs Prof .	Tot .		

10-87-870-100-55-02-02 Detection of Microorganism on Other Planets —H

To design a life detection device based upon change turbidity and pH produced by the growth of bacteria in culture media. This is first life detection principle conceived in the U. S.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	C
1 1 62	1 1 62			
Installation Tech. Rep. QUIMBY F H				
Contractor ROCHESTER UNIV OF	Location of work NY			
Task Status NEW	FY 63 Man Yrs Prof .	Tot .		

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02 INSTRUMENTATION FOR DETECTION OF EXTRATERRESTRIAL LIFE & LIFE-RELATED COMPOUNDS TASK AREA

33-87-870-100-55-02-02 Enzymatic and Fluorometric Techniques —JPL

To establish complete fluormetric analytical procedures for the determination of the nature and concentration of a wide range of biologically important compounds for later Mariner 3 missions.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	WASHBURN H W					X	
Task Status	NEW	FY 63 Man Yrs		Prof	.2	Tot	.7

10-87-870-100-55-02-03 Radioisotopic Probe for Extraterrestrial Life —Hdqt

To design, develop, test and produce a prototype device for the detection of extraterrestrial life by means of the metabolic production of labelled CO_2.

Task Form 1st Dates Issue	1 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	QUIMBY F H						X
Contractor	RESOURCES RESEARCH	Location of work	DC				
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

33-87-870-100-55-02-03 Desert Microflora —JPL

To determine the interrelationships between the soil environment and its indigenous microflora in preparation for the instrumentation and design of extraterrestrial life detection experiments. To develop, by 1965, a soil probe capable of measuring the chemical and biological properties of planetary soils including soil water, gases, temperatures, microbial abundance and other relevant biological parameters of the soil environment.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	WASHBURN H					X	
Task Status	NEW	FY 63 Man Yrs		Prof	1,5	Tot	2,8

10-87-870-100-55-02-04 A Microscopic system for biological research —Hdqt

Research into design of a microscopic system for biological work employing automatic photoelectric registration of dichroism, optical rotation, and phase retardiation due to refraction and birefringence.

Task Form 1st Dates Issue	1 1 63	Curr Issue	1 1 63	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	JACOBS G						X
Contractor	PRINCETON UNIV	Location of work	NJ				
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-87-870-100-55-02-05 Life Detection in Planetary Models and Simulators —Ames

To use planetary models and simulators to estimate those physical conditions which have biological significance on planets. To determine the effects of these conditions on living systems and improve our capabilities for life detection under these conditions.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	YOUNG R S					X	
Task Status	NEW	FY 63 Man Yrs		Prof	1,	Tot	1

33-87-870-100-55-02-05 Biology —Gas Chromatograph —JPL

To study design, develop and test functional model of a gas chromatograph that will perform organic analysis of a solid Martian sample for the specified purpose of biological detection.

Task Form 1st Dates Issue	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	WASHBURN H					X	
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

10-87-870-100-55-02-06 Detection of Extraterrestrial Life by Optical Rotation—Hdqt

To determine the feasibility of detecting extraterrestrial life by means of rotary dispersion profile of pure DNA, including simple optical rotation in the 2600 Angstrom UV region.

Task Form 1st Dates Issue	1 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	QUIMBY F H						X
Contractor	MELPAR INC	Location of work	VA				
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

10-87-870-100-55-02-07 Detection of Extraterrestrial Life by UV Spectrometry —Hdqt

To develop a life detection concept based on the identification of the classical peptide bond which exhibits an extremely high specific absorption in the far ultraviolet (1850 Angstroms).

Task Form 1st Dates Issue	1 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	QUIMBY F H						
Contractor	MELPAR INC	Location of work	VA				
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

10-87-870-100-55-02-08 Indentification of Organic Matter by Mass Spectrometry —Hdqt

To determine the feasibility of identifying life related compounds by means of their mass spectrum.

Task Form 1st Dates Issue	1 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT In House	Contr
Installation Tech. Rep.	QUIMBY F H					.	X
Contractor	MASS INST IT OF TECH	Location of work	MASS				
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	..

33-87-870-100-55-02-03 Mars Biological Microscope —JPL

Development of breadboard model of Mars biological microscope includes special studies of problems associated with development of instrument. a. lenses used; b. micro illumination; c. sample collecting and handling; d. biological staining; e. auto focus mechanism.

Task Form 1st Issue Dates	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	WASHBURN H W					X	
Task Status NEW	FY 63 Man Yrs	Prof	2.9	Tot	2.9		

33-87-870-100-55-02-03 Biology & Carbon 14 —JPL

To help coordinate efforts of Resources Research, Inc. to develop prototype and flight hardware of Radioisotopic Biochemical Probe for Extraterrestrial Life Detection.

Task Form 1st Issue Dates	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	WASHBURN H					X	
Task Status NEW	FY 63 Man Yrs	Prof	.1	Tot	.1		

10-87-870-100-55-02-10 Detection of Extraterrestrial Life by "J" Bands —Hdqt

To determine the feasibility of detecting protein by means of "J" band formation—a color change produced by intense absorption of light in the visible spectrum when certain dyes react with protein.

Task Form 1st Issue Dates	1 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	QUIMBY F H						X
Contractor	FORD MOTOR CO			Location of work	CAL		
Task Status NEW	FY 63 Man Yrs	Prof	.	Tot	.		

33-87-870-100-55-02-10 Instrumentation for Detection of Extraterrestrial Life & Life Related Compounds —JPL

Define methodology for performing several types of enzyme analysis using fluorometric techniques in support of multivator experimenter.

Task Form 1st Issue Dates	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	WASHBURN H					X	
Task Status NEW	FY 63 Man Yrs	Prof	.5	Tot	1		

21-87-870-100-55-02-12 Life Detection Devices —Ames

To conceive, develop, and test Life Detection Devices for use in the study of life on extraterrestrial bodies.

Task Form 1st Issue Dates	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	PAINTER R B					X	
Task Status NEW	FY 63 Man Yrs	Prof	1.	Tot	1		

33-87-870-100-55-02-23 Exobiology Instrumentation —JPL

Design, development, fabrication, and testing of systems, subsystems, and techniques which will permit detection of organic compounds or organisms found in a planetary atmosphere or on a planetary surface.

Task Form 1st Issue Dates	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	WASHBURN H W					X	
Task Status NEW	FY 63 Man Yrs	Prof	2.	Tot	3		

33-87-870-100-55-02-33 Biology—Mars Microscope —JPL

Design, development, fabrication, and testing of systems, subsystems, and techniques which will permit observation and analysis of organic compounds or organisms found in a planetary atmosphere or on a planetary surface.

Task Form 1st Issue Dates	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	HEACOCK R L					X	
Task Status NEW	FY 63 Man Yrs	Prof	.5	Tot	1		

33-87-870-100-55-02-39 Exobiology Instrumentation —JPL

Design, development, fabrication and testing of systems, subsystems, and techniques which will permit collection and analysis of organic compounds or organisms found in a planetary atmosphere or on a planetary surface.

Task Form 1st Issue Dates	7 1 62	Curr Issue	7 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	HEACOCK R L					X	
Task Status NEW	FY 63 Man Yrs	Prof	.5	Tot	1		

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03 SPECTROSCOPIC STUDIES OF PLANETARY ATMOSPHERES & SURFACES TASK AREA

10-87-870-100-55-03-01 **IR Planetary Observations in the Stratosphere** —Hdqt

Same as NsG-255-62 (joint project between California (Berkeley) and Princeton). With the exception of the FY 63 $100,000 above, the Stratoscope II telescope is being loaned to the IR observations with verbal assurance that costs of repair will be covered in the event of substantial damage during recovery.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
1 1 62	1 1 62			
Installation Tech. Rep. QUIMBY F H				X
Contractor PRINCETON UNIV	Location of work NJ			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

10-87-870-100-55-03-02 **IR Planetary Observatory in the Stratosphere** —Hdqt

To obtain IR spectra of Mars and perhaps Venus (with the moon as control) above the major portion of the earth's moisture-laden atmosphere, Princeton University, under another grant, will provide a 36" telescope, balloon, and operations.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
1 1 62	1 1 62			
Installation Tech. Rep. QUIMBY F H				X
Contractor CALIF UNIV OF	Location of work CAL			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

04 EXTRATERRESTRIAL SAMPLE COLLECTION & ANALYSIS TASK AREA

10-87-870-100-55-04-01 **In-flight Photography and Recovery of Meteorites** —Hdqt

To track and recover meteorites by means of camera triangulation stations scattered over 1,000,000 square kilometers in the Mid-western U.S. including parts of Texas.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
1 1 62	1 1 62			
Installation Tech. Rep. QUIMBY F H				X
Contractor SMITHSONIAN INSTIT	Location of work DC			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-87-870-100-55-04-01 **Provide Laboratory and Suitable Technology for Detailed Analysis of Returned Extraterrestrial Samples** —Ames

To establish a central laboratory with the required special equipment and techniques to acquire, return, and analyze completely, returned extraterrestrial samples, from both a biological and biochemical point of view. To develop special sampling and handling techniques and where necessary, analytical techniques.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 62	7 62			
Installation Tech. Rep. YOUNG R S			X	
Task Status NEW	FY 63 Man Yrs	Prof .5	Tot .5	

10-87-870-100-55-04-02 **Sampling for Microbes in the Stratosphere** —Hdqt

To determine the nature and distribution of microorganisms in the atmosphere up to 90,000 feet. Preliminary results indicate that pigmented forms exist in unexpectedly high numbers at 65,000 feet.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
1 1 62	1 1 62			
Installation Tech. Rep. QUIMBY F H				X
Contractor GENERAL MILLS INC	Location of work MINN			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

10-87-870-100-55-04-03 **Analysis for Hydrocarbons in Mineral Aggregates** —Hdqt

To develop and apply techniques to the analysis of representative samples of hydrocarbons present in low concentrations in terrestrial mineral aggregates.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
1 1 62	1 1 62			
Installation Tech. Rep. QUIMBY F H				X
Contractor SHELL OIL CO	Location of work CAL			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

21-87-870-100-55-04-03 **Analysis of Bio-organic Materials of Extraterrestrial Origin** —Ames

The organic chemical analysis of meteoritic material to investigate the origin of formed "fossil-like" bodies found in such material. To study organic compounds in meteorites, as to the possibility of living origin, and to compare such material to natural and synthetic compounds on earth. Meteorites to be obtained from existing collections (Dr. Calvin, the Smithsonian Institute) and also from collections obtained from NASA contracts.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
7 62	7 62			
Installation Tech. Rep. YOUNG R S			X	
Task Status NEW	FY 63 Man Yrs	Prof 1.	Tot 1.	

10-87-870-100-55-04-04 **Biogeochemical Studies of Meteorites** —Hdqt

To determine the nature and origin of organic material in meteorites.

Task Form 1st Dates Issue	Curr Issue	Est Task Compl	EFFORT In-House	Contr
1 1 62	1 1 62			
Installation Tech. Rep. QUIMBY F H				X
Contractor CALIF INSTIT OF TEC	Location of work CAL			
Task Status NEW	FY 63 Man Yrs	Prof .	Tot .	

10-87-870-100-55-04-05 **Development of Upper Atmosphere Sampler** —Hdqt

To develop a means of sampling the microorganisms in the upper terrestrial atmosphere. To accomplish maximum recovery from large samples of ambient air without the danger of significant contamination.

Task Form 1st Dates Issue	1 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	QUIMBY F H						X
Contractor	CALIF UNIV OF			Location of work	CAL		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

10-87-870-100-55-04-03 Analysis of Carbonaceous Meteorites —Hdqt

To determine the size, shape, number and nature of organized elements ("fossils") in carbonaceous chondrites. Modern chemical and optical techniques will be employed with particular emphasis on prevention of contamination during preparation and observation of the material.

Task Form 1st Dates Issue	1 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	QUIMBY F H						X
Contractor	FORDHAM UNIV			Location of work	NY		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

10-87-870-100-55-04-07 Hydrocarbon Analysis in Detection of Life —Hdqt

To conduct a survey of various natural lipids and the isolation of equivalent compounds from organisms and sediments of different genological ages, including an analysis of their biogenically produced constituents.

Task Form 1st Dates Issue	1 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	QUIMBY F H						X
Contractor	ESSO RESRCH AND ENG			Location of work	NJ		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

10-87-870-100-55-04-08 Meteorite Studies —Hdqt

Isolation and identification of organic compounds in meteorites by means of chromatographic, spectrophotometric techniques, biological staining, uv-fluorescence microscopy and possibly microspectrophotometry.

Task Form 1st Dates Issue	1 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	QUIMBY F H						X
Contractor	NOT REPORTED			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

21-87-870-100-55-04-19 Isolation of Viruses and Bacteria —Jmes

Various systems and procedures for the isolation of viruses and bacteria from soil and atmospheric samples will be examined as a prelude to testing of extraterrestrial materials.

Task Form 1st Dates Issue	7 62	Curr Issue	7 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	FROMMHAGEN L H					X	
Task Status	NEW	FY 63 Man Yrs		Prof	1.	Tot	1.

08 STERILIZATION OF SPACECRAFT TASK AREA

10-87-870-100-55-05-01 Sterilization of Space Probes —Hdq

To develop standard operation procedures for the appli cation of heat to spacecraft or to capsules in toto in order to completely steriliz missions destined for Mars.

Task Form 1st Dates Issue	1 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	QUIMBY F H						X
Contractor	WILMOT CASTLE CO			Location of work	NY		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

10-87-870-100-55-05-02 Sterilization of Spacecraft —Hdq

Studies and development of methods for the decontamin tion of spacecraft with emphasis on levels of natural contamination in component and the utilization of ethylene oxide for surface sterilization.

Task Form 1st Dates Issue	1 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT In-House	Cont
Installation Tech. Rep.	QUIMBY F H						X
Contractor	US ARMY			Location of work	MD		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

10-87-870-100-55-05-03 Viability of Organisms in Simulated Space —Hd

To determine the ability of microorganisms to survi various combinations of freezing, ionizing radiation, dessication, UV, and spa vacuum.

Task Form 1st Dates Issue	1 1 62	Curr Issue	1 1 62	Est Task Compl		EFFORT In-House	Con
Installation Tech. Rep.	QUIMBY F H						X
Contractor	NAT RESRCH CORP			Location of work	MASS		
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

91 MANNED SPACECRAFT SYSTEMS PROGRAM
910 Director of Spacecraft & Flight Missions

49 Human Performance & Behavior Sub-program

01 PERCEPTION TASK AREA

10-91-910-101-49-01-67 Human Engineering Design Criteria for Space Systems —Hdqt

Development of human engineering standards for use in design and development of space vehicles and associated equipment.

Task Form 1st Dates Issue	7162	Curr Issue	7162	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	LRV_INE_R P					X	X
Contractor	GENERAL_DYNAMICS			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	.2	Tot	.2

04 MAINTAINING ASTRONAUT ALERTNESS TASK AREA

10-91-910-101-49-04-09 Maintaining Astronaut Alertness —Hdqt

To define alertness operationally in terms of astronaut task requirements, to develop methods and criteria for its measurement, and to develop methods for its maintenance during the critical aspects of flight missions.

Task Form 1st Dates Issue	7162	Curr Issue	7162	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	LRV_ING_R P					X	X
Contractor	BIO DYNAMICS			Location of work	MASS		
Task Status	NEW	FY 63 Man Yrs		Prof	.1	Tot	.1

51 Physical Biology Sub-program

03 CONTROLS & OPERATIONS TASK AREA

35-91-910-101-51-03-01 In-flight Simulation for Behavioral Studies —MSC

To develop equipment for controlled studies of astronaut performance during flight. Equipment and test will be developed to permit studies of pilot performance in tasks not necessarily associated with direct control of the spacecraft.

Task Form 1st Dates Issue	9162	Curr Issue	9162	Est Task Compl		EFFORT In-House	Contr
Installation Tech. Rep.	NOT_REPORTED						X
Contractor	NOT_REPORTED			Location of work			
Task Status	NEW	FY 63 Man Yrs		Prof	.	Tot	.

35-91-910-101-51-03-02 Crew Activities Associated with Space Flight Oper.—MSC

To provide, for the astronauts, an early familiarization with the various dynamic phases of a lunar mission and to investigate the feasibility of manual control in several critical phases of the lunar mission.

Task Form 1st Dates Issue	7163	3163	Est Task Compl	3163	EFFORT In-House	Contr
Installation Tech. Rep.	NORTH W J				X	X
Contractor	MARTIN		Location of work	MD		
Task Status	REPLA	FY 63 Man Yrs	Prof	3.	Tot	.

TASK CROSS INDEX BY HEADQUARTERS PROGRAM OFFICE

770 DIRECTOR OF BIOTECHNOLOGY AND HUMAN RESEARCH

49 Human Performance & Behavior Sub-program

21-77-770-100-49-01-01	Neurohormonal Studies as Related to Space Flight Stresses	
21-77-770-100-49-01-02	Pituitary Chemistry	—Ames
10-77-770-100-49-01-03	Respiratory	—Hdqt
21-77-770-100-49-01-03	Research in Cerebral Neurophysiology and Its Applications in Monitoring Behavioral States	—Ames
10-77-770-100-49-01-05	Central Nervous System	—Hdqt
10-77-770-100-49-01-06	Central Nervous Systems	—Hdqt
10-77-770-100-49-01-07	Central Nervous System	—Hdqt
10-77-770-100-49-01-08	Central Nervous System	—Hdqt
10-77-770-100-49-01-09	Gastrointestinal and Metabolic	—Hdqt
10-77-770-100-49-01-10	Endocrine	—Hdqt
10-77-770-100-49-02-01	Ion Effects on Man	—Hdqt
21-77-770-100-49-02-01	Vision, Circulation and Respiration under Sustained Acceleration	—Ames
10-77-770-100-49-02-02	Acceleration	—Hdqt
21-77-770-100-49-02-02	Study of Long-Term Effects of Low G-loading on Mammals (mice, rats, etc.)	—Ames
10-77-770-100-49-02-03	Acceleration	—Hdqt
21-77-770-100-49-02-03	Metabolism of Animals as Influenced by Space Environmental Conditions	—Ames
10-77-770-100-49-02-04	Acceleration	—Hdqt
21-77-770-100-49-02-04	Radiation Dosimetry and Measurement	—Ames
10-77-770-100-49-02-05	Radiation	—Hdqt
21-77-770-100-49-02-05	Theoretical Study of High Energy Radiations in Relation to Biological Systems	—Ames
10-77-770-100-49-02-06	Radiation	—Hdqt
21-77-770-100-49-02-06	Effects of High G Loading on Metabolism	—Ames
10-77-770-100-49-02-07	Radiation	—Hdqt
21-77-770-100-49-02-07	Pathological Studies on the Brains of Mice and One Monkey to be Exposed to Cosmic Radiation in High Altitude Balloon Flights	—Ames
10-77-770-100-49-02-08	Radiation	—Hdqt
21-77-770-100-49-02-08	Space Physiology (Extension of NsG 139-61)	—Ames
10-77-770-100-49-02-09	Predominating Fecal Flora in Man	—Hdqt
21-77-770-100-49-02-09	Histopathological Study of the Effect of Fission Fragments on the Central Nervous System and Selected Organs (NNS 2-1336)	—Ames
10-77-770-100-49-02-10	Non-Ionizing Energy Fields	—Hdqt
21-77-770-100-49-02-10	Parametric Study of Flight-Induced Pulmonary Pathology	
10-77-770-100-49-02-11	Non-Ionizing Energy Fields	—Hdqt
21-77-770-100-49-02-11	Electroencephalophysiological—Task Performance Correlates	
10-77-770-100-49-02-12	Atmospheric Conditions	—Hdqt
21-77-770-100-49-02-12	Biological Research with Heavy Ion Beams	—Ames
10-77-770-100-49-02-13	Atmospheric Conditions	—Hdqt
21-77-770-100-49-02-13	Dosimetry of High Energy Radiation	—Ames
10-77-770-100-49-02-14	Atmospheric Conditions	—Hdqt
21-77-770-100-49-02-14	Post-Mortem Clinical Analysis of Biological Specimens	
10-77-770-100-49-02-15	Radiation	—Hdqt
10-77-770-100-49-02-16	Radiation	—Hdqt
10-77-770-100-49-02-17	Radiation	—Hdqt
10-77-770-100-49-02-18	Acceleration	—Hdqt
10-77-770-100-49-02-19	Environmental Physiology	—Hdqt
10-77-770-100-49-02-20	Radiation	—Hdqt
10-77-770-100-49-02-21	Free Space—Extravehicular and Surface Environmental Studies	—Hdqt
10-77-770-100-49-03-01	Pharmacology, Prophylaxis and Therapy	—Hdqt
21-77-770-100-49-03-01	Ocular Impedance Plethysmography	—Ames
10-77-770-100-49-03-02	Toxicology	—Hdqt
23-77-770-100-49-03-04	Effect of Rough Air on Aircraft Crew Performance	—LRC
10-77-770-100-49-04-01	Natural Rhythmic and Circadian Patterns	—Hdqt
21-77-770-100-49-04-01	Auditory Perception During Space Mission	—Ames
23-77-770-100-49-04-01	Studies of Man in a Rotating Environment	—LRC
10-77-770-100-49-04-02	Information Reception & Transmission	—Hdqt
21-77-770-100-49-04-02	Visual Perception During Space Missions	—Ames
23-77-770-100-49-04-02	Determination of Visual Acuity	—LRC
10-77-770-100-49-04-03	Cerebral Mechanisms	—Hdqt
21-77-770-100-49-04-03	Decision Making in Space System Operation	—Ames
10-77-770-100-49-04-04	Cerebral Mechanisms	—Hdqt
23-77-770-100-49-05-01	Examination of Methods for Simulating Zero "G"	—LRC
23-77-770-100-49-05-02	Human Behavior and Performance During Simulated Long Duration Missions	—LRC

51 Physical Biology Sub-program

10-77-770-100-51-01-01	Effects of Isolation, Sensory Deprivation & Sensory Rearrangement	—Hdqt
21-77-770-100-51-01-01	Skilled Performance in Space Vehicle Control	—Ames
10-77-770-100-51-01-02	Handbooks of Human Factors Methods	—Hdqt
21-77-770-100-51-01-02	Communication in Space Operations	—Ames
10-77-770-100-51-01-03	Biological Mechanisms	—Hdqt
21-77-770-100-51-01-03	Pilot's Ability to Cope with Sudden Changes in the Controlled Element	—Ames
10-77-770-100-51-01-04	Characteristics of the Segments of the Human Body	
21-77-770-100-51-01-04	Application of Reliability Theory to the Allocation of Function Between the Pilot and the Vehicle Systems	—Ames
10-77-770-100-51-01-05	Biological Mechanisms	—Hdqt
21-77-770-100-51-01-05	Problem Areas Associated with Flight Through Turbulent Air	—Ames
21-77-770-100-51-01-06	Vestibular Motion Cues Used by the Human Pilot	—Ames
21-77-770-100-51-01-07	Human Pilot Control Problems in a Manned Planetary Landing	—Ames
21-77-770-100-51-01-08	Design Principles for Display and Control Systems for Recovery from Unusual Attitudes	—Ames
21-77-770-100-51-01-09	Human Pilot Control Problems in a Manual Abort of a Lunar or Planetary Mission	—Ames
21-77-770-100-51-01-10	Effects of Individual Environmental Stresses of Space Flight on Human Pilot Performance	—Ames
21-77-770-100-51-01-11	Biological Control Systems—A Comprehensive and Critical Review of the Field	—Ames
21-77-770-100-51-01-12	Utilization of Bioelectric Potentials, Support Phase I	
10-77-770-100-51-02-01	M-MIC	—Hdqt
21-77-770-100-51-02-01	Operator Selection for Space Missions	—Ames
23-77-770-100-51-02-01	One-Man Vehicular Locomotion	—LRC
10-77-770-100-51-03-01	Remote Control Systems	—Hdqt
21-77-770-100-51-03-01	Development of Physiological Monitoring Equipment for Use in Motion Flight Simulators and Aircraft	—Ames
24-77-770-100-51-03-01	Crew-Aircraft Integration	—FRC
10-77-770-100-51-03-02	Evaluation of Advanced Integrated Display & Control Systems	—Hdqt
21-77-770-100-51-03-02	Piloted Simulator Requirements for Effective Research, Development, and Training	—Ames
10-77-770-100-51-03-03	Advanced Integrated Display & Control Systems	—Hdqt
23-77-770-100-51-03-03	Determination of Pilot Dynamic Characteristics	—LRC

53 Life Support Sub-program

10-77-770-100-53-01-01	Photosynthetic Gas Exchanger	—Hdqt
21-77-770-100-53-01-01	Heat Regulation at Reduced Pressures	—Ames
23-77-770-100-53-01-01	Development of Life Support Systems	—LRC
10-77-770-100-53-01-02	Electrolyte Oxygen Generator	—Hdqt
21-77-770-100-53-01-02	Regenerative Characteristics of Adsorbers Used in Environmental Control Systems	—Ames
23-77-770-100-53-01-02	Integrated Advanced Life Support System	—LRC
10-77-770-100-53-01-03	Parameters Essential for Manned Flight Operation	—Hdqt
21-77-770-100-53-01-03	Closed Life Support System Optimization Studies	—Ames
10-77-770-100-53-01-04	Integrated Human Maintenance Subsystem	—Hdqt
21-77-770-100-53-01-04	Effects of High Oxygen Tensions on Central Nervous System	—Ames
10-77-770-100-53-01-05	CO_2 Reduction System	—Hdqt
10-77-770-100-53-01-06	Use of Ozonides for Air Revitalization	—Hdqt
10-77-770-100-53-01-07	Metallic Superoxides	—Hdqt
10-77-770-100-53-03-01	Bioelectrochemistry	—Hdqt
21-77-770-100-53-03-01	Design Construction and Test of an Integrated Human Maintenance Subsystem	—Ames
21-77-770-100-53-04-01	Improvement of the Ames Support and Restraint System	
21-77-770-100-53-04-02	Anthropometric Devices for Planetary Exploration	—Ames
10-77-770-100-53-05-01	Miniaturized TV Camera	—Hdqt
10-77-770-100-53-06-01	Bio-Electrogenesis	—Hdqt
21-77-770-100-53-06-01	Arterial Pulse Pressure Ear Oximeter Telemetry	—Ames
24-77-770-100-53-06-01	Psychophysiological Information Acquisition Processing and Control System (PIAPACS)	—FRC
10-77-770-100-53-06-02	Photosynthetic Gas Exchanger	—Hdqt
21-77-770-100-53-06-02	Study and Evaluation of Psychophysiological Monitoring Techniques for Use in Advanced Aerospace Missions	
10-77-770-100-53-06-03	Human Factors Bioinstrumentation	—Hdqt
21-77-770-100-53-06-03	Biological Design Studies of Man	—Ames
10-77-770-100-53-07-01	Evaluation of Control Display Parameters	—Hdqt
24-77-770-100-53-07-01	Research on Self-Powered Metabolic Systems	—FRC
10-77-770-100-53-07-02	Evaluation of Control-Display Parameters	—Hdqt

870 DIRECTOR OF BIOSCIENCE PROGRAMS

52 Behavioral Biology Sub-program

21-87-870-100-52-01-01	Behavioral Effects of Rotation and Acceleration —Ames
21-87-870-100-52-01-02	Neuroendocrinological Aspects of the Inter-relationships Between Biological Rhythms and the Stresses of Space Flight —Ames
21-87-870-100-52-02-01	Physiology of Vestibular Nuleous —Ames
21-87-870-100-52-02-02	"End Points" in Neural Organization —Ames
21-87-870-100-52-02-03	Vestibular Brain Mechanisms —Ames
21-87-870-100-52-02-04	Biochemical-Electrical Interrelationships in Simple Biological Information Storage Systems —Ames
10-87-870-100-52-03-05	Support of A Computer Technology Center for Research on MIND Computers —Hdqt
21-87-870-100-52-04-01	Learning and Discrimination of Probability Schedule
21-87-870-100-52-04-02	Environmental Determinants of Behavior —Ames
10-87-870-100-52-04-03	Circadian Rhythms in Man Under Controlled Environmental Conditions —Hdqt
21-87-870-100-52-04-03	Control of Complex Behavior in Infra-Human Organisms
21-87-870-100-52-04-05	Development of an Empirical Calculus of Reinforcement Value —Ames

54 Environmental Biology Sub-program

10-87-870-100-54-01-03	Study on Effect of Weightlessness on Photosynthesis
10-87-870-100-54-01-04	Program of Research in Space Genetics —Hdqt
33-87-870-100-54-01-04	Tissue Equivalent Dosimeter Feasibility Study —JPL
10-87-870-100-54-01-05	Study of the Use of Fungal Luminescence as a Physiological Index —Hdqt
21-87-870-100-54-01-05	Instrumentation of Small Animals for Radiation Detection
10-87-870-100-54-01-06	Growth Patterns of Plants in the Absence of Gravity Effects
10-87-870-100-54-01-07	Life Sciences Instrumentation —Hdqt
10-87-870-100-54-01-08	A Workship on Dictelometry —Hdqt
21-87-870-100-54-02-01	Effects of Low Magnetic Fields on Living Material —Ames
10-87-870-100-54-02-02	Effects of Very Strong Magnetic Fields and of Magnet Field-free Environments on Animals and Man —Hdqt
21-87-870-100-54-02-02	Amelioration of Radiation Effects by Dietary Control—Ames
21-87-870-100-54-02-03	Effect of High Magnetic Field on Living Material —Ames
21-87-870-100-54-02-05	Radiation Protection by Alteration of G-I Function —Ames
21-87-870-100-54-02-06	Study Long-term Effects of Low G-loading on Plants—Ames
10-87-870-100-54-02-07	Research on Pathogen Free Plants in a Microcosm & on the Effect of High Intensity Light on Plant Growth —Hdqt
21-87-870-100-54-02-08	Study Long-term Effects of Low G-loading on Single-celled Systems —Ames
21-87-870-100-54-02-09	Study the Direct Effects of Alpha Particle Radiation on the Rat Brain —Ames
10-87-870-100-54-02-10	Individualized, Chemically-Defined Diets in Life Support Systems During Space Flight —Hdqt
21-87-870-100-54-02-10	Biological Effects of Ground Based Ionizing Radiation (X-rays) —Ames
10-87-870-100-54-02-11	To investigate the Use of Perognathus as An Experimental Organism for Space Biology Research —Hdqt
21-87-870-100-54-02-11	Effects of Simulated Extraterrestrial Conditions on Somatic Mitosis and/or Mutation Rate —Ames
10-87-870-100-54-02-12	Freezing and Drying of Living Cells —Hdqt
21-87-870-100-54-02-12	Effect of Space Voyage Stress on Synthetic Metabolic Processes —Ames
10-87-870-100-54-02-13	Interdisciplinary Studies of the Effects of Space Environments on Biological Systems —Hdqt
21-87-870-100-54-02-13	Nucleotide variations of certain tissues in Response to Some Environmental Alterations —Ames
10-87-870-100-54-02-14	Biological Effect of Chronic Exposure to Artificial Atmospheres —Hdqt
21-87-870-100-54-02-14	Protein Synthesis of Different Tissues of the Rat in Response to Various Corticoids —Ames
10-87-870-100-54-02-15	Development of a Superior Diet for Man in Space —Hdqt
21-87-870-100-54-02-15	Roentgenographic Estimation of Bone Age in the Cynomolgus Monkey —Ames
21-87-870-100-54-02-16	Effects of Simulated Extraterrestial Conditions on Immune Mechanisms —Ames
21-87-870-100-54-02-17	Enclosure Monitoring of Fibrinolysis —Ames
10-87-870-100-54-03-01	Support of White Mountain Alpine Research Station & Study of the Physiology of Natural High Altitude Hibernating Animals —Hdqt
21-87-870-100-54-04-02	Effects of Simulated Planetary Environment on Earth Organisms —Ames
10-87-870-100-54-04-03	Biochemical Activities of Terrestrial Microorganisms in Simulated Planetary Environments —Hdqt
10-87-870-100-54-04-04	Research on Life in Extraterrestrial Environments —Hdqt
10-87-870-100-54-04-05	Effects of Very Strong Magnetic Fields and of Magnet Field-free Environments on Animals and Man —Hdqt
10-87-870-100-54-05-01	Physiological Effects of Weightlessness and Space Radiations on Hibernators —Hdqt
21-87-870-100-54-05-03	Incorporation and Metabolism of Nitrogen by Plants
10-87-870-100-54-05-07	Plant Leaves for the Production of Oxygen in a Closed System —Hdqt
21-87-870-100-54-05-07	Comparative Effects of Protons and X-rays on Intestinal Injury and Recovery in the Rat, Dog, Guinea Pig, and Hibernating Mammals —Ames
10-87-870-100-54-05-08	Support of White Mountain Alpine Research Station & Study of the Physiology of Natural High Altitude Hibernating Animals —Hdqt
10-87-870-100-54-05-11	Utilization of Bio-electric Potentials —Hdqt

55 Exobiology Sub-program

10-87-870-100-55-01-01	Studies of Extremely small self-replicating Systems—Hdqt
10-87-870-100-55-01-03	Studies on the Hill Reaction Activity of Soluble Chloroplast Extracts —Hdqt
10-87-870-100-55-01-04	Molecular Evolution —Hdqt
21-87-870-100-55-01-04	Synthesis of Protein Microspheres to Serve as A Cell Model for Research on the Origin of Life, etc. —Ames
10-87-870-100-55-01-05	Microspectrophotometry of Pigments & Organic molecules
21-87-870-100-55-01-05	Chemistry of Formation of Biologically-significant Molecules Under Primitive Earth and Extraterrestrial Conditions
21-87-870-100-55-01-07	Properties of Monolayers of Cell Membrane Components at Liquid Interfaces —Ames
21-87-870-100-55-01-08	Physico-Chemical Properties of Artificial Multilayer Systems
10-87-870-100-55-01-10	Dynamic Systems Response of the Performance Characteristics of Some Major Biophysical Systems of Interest
21-87-870-100-55-01-10	Effects of Extraterrestrial Conditions on the Metabolism of Tissue Maintained in Culture —Ames
10-87-870-100-55-01-11	Molecular Energetics —Hdqt
21-87-870-100-55-01-11	Factors Controlling the Formation of Hereditary Materials
10-87-870-100-55-01-13	Organic Cosmochemistry —Hdqt
21-87-870-100-55-01-13	A Study of Molecular Structures and Reactions Occurring in Biological Systems Irradiated with Ultraviolet Light
10-87-870-100-55-01-14	Space Bioscience Institute —Hdqt
21-87-870-100-55-01-14	Study of Smallest Replicating Units of Heredity —Ames
10-87-870-100-55-01-15	Primeval Synthesis of Porphine-like Substances —Hdqt
21-87-870-100-55-01-15	The Mechanism of Radiation-Induced Delay of Cell Division
21-87-870-100-55-01-16	Radiation Effects on Photosynthetic Organisms —Ames
21-87-870-100-55-01-17	Lipid Involvement in Photosynthesis —Ames
10-87-870-100-55-01-18	Reflection Spectra, Meteorite Analysis and Chemical Evo-
21-87-870-100-55-01-18	Structure of Nucleic Acids of Viruses —Ames
10-87-870-100-55-01-19	Evolution of Enzymes on Nucleic Acids —Hdqt
10-87-870-100-55-01-20	Physics of Cellular Synthesis, Growth and Division —Hdqt
10-87-870-100-55-02-01	Cytochemical Studies of Planetary Microorganisms —Hdqt
10-87-870-100-55-02-02	Detection of Microorganism on Other Planets —Hdqt
33-87-870-100-55-02-02	Enzymatic and Fluorometric Techniques —JPL
10-87-870-100-55-02-03	Radioisotopic Probe for Extraterrestrial Life —Hdqt
33-87-870-100-55-02-03	Desert Microflora —JPL
10-87-870-100-55-02-04	A Microscopic system for biological research —Hdqt
21-87-870-100-55-02-05	Life Detection in Planetary Models and Simulators —Ames
33-87-870-100-55-02-05	Biology —Gas Chromatograph —JPL
10-87-870-100-55-02-06	Detection of Extraterrestrial Life by Optical Rotation—Hdqt
10-87-870-100-55-02-07	Detection of Extraterrestrial Life by UV Spectrometry
10-87-870-100-55-02-08	Identification of Organic Matter by Mass Spectrometry
33-87-870-100-55-02-08	Mars Biological Microscope —JPL
33-87-870-100-55-02-09	Biology & Carbon 14 —JPL
10-87-870-100-55-02-10	Detection of Extraterrestrial Life by "J" Bands —Hdqt
33-87-870-100-55-02-10	Instrumentation for Detection of Extraterrestrial Life &
33-87-870-100-55-02-11	Instrumentation for Detection of Extraterrestrial Life &
21-87-870-100-55-02-12	Life Detection Devices —Ames
33-87-870-100-55-02-25	Exobiology Instrumentation —JPL
33-87-870-100-55-02-38	Biology—Mars Microscope —JPL
33-87-870-100-55-02-39	Exobiology Instrumentation —JPL

TASK CROSS INDEX BY HEADQUARTERS PROGRAM OFFICE

910 DIRECTOR OF SPACECRAFT & FLIGHT MISSIONS

49 Human Performance & Behavior Sub-program

10-91-910-101-49-01-67 Human Engineering Design Criteria for Space Systems
10-91-910-101-49-04-09 Maintaining Astronaut Alertness —Hdqt

51 Physical Biology Sub-program

35-91-910-101-51-03-01 In-flight Simulation for Behavioral Studies —MSC
35-91-910-101-51-03-02 Crew Activities Associated with Space Flight Oper.—MSC

10 HEADQUARTERS

77 HUMAN FACTORS SYSTEMS PROGRAM

49 Human Performance & Behavior Sub-program

01 PERCEPTION TASK AREA

10-77-770-100-49-01-03	Respiratory	—Hdat
10-77-770-100-49-01-05	Central Nervous System	—Hdat
10-77-770-100-49-01-06	Central Nervous Systems	—Hdat
10-77-770-100-49-01-07	Central Nervous System	—Hdat
10-77-770-100-49-01-08	Central Nervous System	—Hdat
10-77-770-100-49-01-09	Gastrointestinal and Metabolic	—Hdat
10-77-770-100-49-01-10	Endocrine	—Hdat

02 ENVIRONMENTAL PHYSIOLOGY TASK AREA

10-77-770-100-49-02-01	Ion Effects on Man	—Hdat
10-77-770-100-49-02-02	Acceleration	—Hdat
10-77-770-100-49-02-03	Acceleration	—Hdat
10-77-770-100-49-02-04	Acceleration	—Hdat
10-77-770-100-49-02-05	Radiation	—Hdat
10-77-770-100-49-02-06	Radiation	—Hdat
10-77-770-100-49-02-07	Radiation	—Hdat
10-77-770-100-49-02-08	Radiation	—Hdat
10-77-770-100-49-02-09	Predominating Fecal Flora in Man	—Hdat
10-77-770-100-49-02-10	Non-Ionizing Energy Fields	—Hdat
10-77-770-100-49-02-11	Non-Ionizing Energy Fields	—Hdat
10-77-770-100-49-02-12	Atmospheric Conditions	—Hdat
10-77-770-100-49-02-13	Atmospheric Conditions	—Hdat
10-77-770-100-49-02-14	Atmospheric Conditions	—Hdat
10-77-770-100-49-02-15	Radiation	—Hdat
10-77-770-100-49-02-16	Radiation	—Hdat
10-77-770-100-49-02-17	Radiation	—Hdat
10-77-770-100-49-02-18	Acceleration	—Hdat
10-77-770-100-49-02-19	Environmental Physiology	—Hdat
10-77-770-100-49-02-20	Radiation	—Hdat
10-77-770-100-49-02-21	Free Space—Extravehicular and Surface Environmental Studies	—Hdat

03 BIO MEDICINE & PERSONNEL SELECTION TASK AREA

10-77-770-100-49-03-01	Pharmacology, Prophylaxis and Therapy	—Hdat
10-77-770-100-49-03-02	Toxicology	—Hdat

04 PSYCO-PHYSIOLOGY & BEHAVIORAL SCIENCES TASK AREA

10-77-770-100-49-04-01	Natural Rhythmic and Circadian Patterns	—Hdat
10-77-770-100-49-04-02	Information Reception & Transmission	—Hdat
10-77-770-100-49-04-03	Cerebral Mechanisms	—Hdat
10-77-770-100-49-04-04	Cerebral Mechanisms	—Hdat

51 Physical Biology Sub-program

01 BIOCHEMICALS TASK AREA

10-77-770-100-51-01-01	Effects of Isolation, Sensory Deprivation & Sensory Rearrangement	—Hdat
10-77-770-100-51-01-02	Handbooks of Human Factors Methods	—Hdat
10-77-770-100-51-01-03	Biological Mechanisms	—Hdat
10-77-770-100-51-01-04	Characteristics of the Segments of the Human Body	
10-77-770-100-51-01-05	Biological Mechanisms	—Hdat

02 INFORMATION ACQUISITION TASK AREA

10-77-770-100-51-02-01	M-MIC	—Hdat

03 CONTROLS & OPERATIONS TASK AREA

10-77-770-100-51-03-01	Remote Control Systems	—Hdat
10-77-770-100-51-03-02	Evaluation of Advanced Integrated Display & Control Systems	—Hdat
10-77-770-100-51-03-03	Advanced Integrated Display & Control Systems	—Hdat

53 Life Support Sub-program

01 ATMOSPHERE CONTROL TASK AREA

10-77-770-100-53-01-01	Photosynthetic Gas Exchanger	—Hdat
10-77-770-100-53-01-02	Electrolyte Oxygen Generator	—Hdat
10-77-770-100-53-01-03	Parameters Essential for Manned Flight Operation	—Hdat
10-77-770-100-53-01-04	Integrated Human Maintenance Subsystem	—Hdat
10-77-770-100-53-01-05	CO_2 Reduction System	—Hdat
10-77-770-100-53-01-06	Use of Ozonides for Air Revitalization	—Hdat
10-77-770-100-53-01-07	Metallic Superoxides	—Hdat

03 WASTE DISPOSAL TASK AREA

10-77-770-100-53-03-01	Bioelectrochemistry	—Hdat

05 SYSTEMS STUDIES TASK AREA

10-77-770-100-53-05-01	Miniaturized TV Camera	—Hdat

06 BIO ENGINEERING TASK AREA

10-77-770-100-53-06-01	Bio-Electrogenesis	—Hdat
10-77-770-100-53-06-02	Photosynthetic Gas Exchanger	—Hdat
10-77-770-100-53-06-03	Human Factors Bioinstrumentation	—Hdat

07 PERSONNEL EQUIPMENT TASK AREA

10-77-770-100-53-07-01	Evaluation of Control Display Parameters	—Hdat
10-77-770-100-53-07-02	Evaluation of Control-Display Parameters	—Hdat

87 BIOSCIENCE PROGRAM

52 Behavioral Biology Sub-program

03 BIOLOGICAL INFORMATION, CONTROL, & COMMUNICATION SYSTEMS TASK AREA

10-87-870-100-52-03-03	Support of A Computer Technology Center for Research on MNC Computers	—Hdat

04 EXPERIMENTAL ANALYSIS OF BEHAVIOR TASK AREA

10-87-870-100-52-04-03	Circadian Rhythms in Man Under Controlled Environmental Conditions	—Hdat

54 Environmental Biology Sub-program

01 DEVELOPMENT OF EXPERIMENTS FOR STUDIES OF SPACE FLIGHT ENVIRONMENTAL EFFECTS ON ORGANISMS TASK AREA

10-87-870-100-54-01-03	Study on Effect of Weightlessness on Photosynthesis	
10-87-870-100-54-01-04	Program of Research in Space Genetics	—Hdat
10-87-870-100-54-01-05	Study of the Use of Fungal Luminescence as a Physiological Index	—Hdat
10-87-870-100-54-01-06	Growth Patterns of Plants in the Absence of Gravity Effects	
10-87-870-100-54-01-07	Life Sciences Instrumentation	—Hdat
10-87-870-100-54-01-08	A Workship on Biotelemetry	—Hdat

02 GROUND STUDIES OF SPACE FLIGHT ENVIRONMENTAL EFFECTS ON ORGANISMS TASK AREA

10-87-870-100-54-02-02	Effects of Very Strong Magnetic Fields and of Magnet Field-free Environments on Animals and Man	—Hdat
10-87-870-100-54-02-07	Research on Pathogen Free Plants in a Microcosm & on the Effect of High Intensity Light on Plant Growth	—Hdat
10-87-870-100-54-02-10	Individualized, Chemically-Defined Diets in Life Support Systems During Space Flight	—Hdat
10-87-870-100-54-02-11	To investigate the Use of Perognathus as An Experimental Organism for Space Biology Research	—Hdat
10-87-870-100-54-02-12	Freezing and Drying of Living Cells	—Hdat
10-87-870-100-54-02-13	Interdisciplinary Studies of the Effects of Space Environments on Biological Systems	—Hdat
10-87-870-100-54-02-14	Biological Effect of Chronic Exposure to Artificial Atmospheres	—Hdat
10-87-870-100-54-02-15	Development of a Superior Diet for Man in Space	—Hdat

03 BIOLOGICAL ANALYSIS OF TERRESTRIAL ENVIRONMENTAL EXTREMES TASK AREA

10-87-870-100-54-03-01	Support of White Mountain Alpine Research Station & Study of the Physiology of Natural High Altitude Hibernating Animals	—Hdat

04 EFFECTS OF SIMULATED EXTRATERRESTRIAL ENVIRONMENTS ON EARTH ORGANISMS TASK AREA

10-87-870-100-54-04-03	Biochemical Activities of Terrestrial Microorganisms in Simulated Planetary Environments	—Hdat
10-87-870-100-54-04-04	Research on Life in Extraterrestrial Environments	—Hdat
10-87-870-100-54-04-05	Effects of Very Strong Magnetic Fields and of Magnet Field-free Environments on Animals and Man	—Hdat

05 STUDIES OF BIOLOGICAL MATERIALS & SYSTEMS FOR USE IN SPACE TASK AREA

10-87-870-100-54-05-01	Physiological Effects of Weightlessness and Space Radiations on Hibernators	—Hdat
10-87-870-100-54-05-07	Plant Leaves for the Production of Oxygen in a Closed System	—Hdat
10-87-870-100-54-05-08	Support of White Mountain Alpine Research Station & Study of the Physiology of Natural High Altitude Hibernating Animals	—Hdat
10-87-870-100-54-05-11	Utilization of Bio-electric Potentials	—Hdat

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55 Exobiology Sub-program

01 EVOLUTIONARY & THEORETICAL BIOLOGY TASK AREA

10-87-870-100-55-01-01 Studies of Extremely small self-replicating Systems—Hdqt
10-87-870-100-55-01-03 Studies on the Hill Reaction Activity of Soluble Chloroplast Extracts —Hdqt
10-87-870-100-55-01-04 Molecular Evolution —Hdqt
10-87-870-100-55-01-05 Microspectrophotometry of Pigments & Organic molecules
10-87-870-100-55-01-10 Dynamic Systems Response of the Performance Characteristics of Some Major Biophysical Systems of Interest
10-87-870-100-55-01-11 Molecular Energetics —Hdqt
10-87-870-100-55-01-13 Organic Cosmochemistry —Hdqt
10-87-870-100-55-01-14 Space Bioscience Institute —Hdqt
10-87-870-100-55-01-15 Primeval Synthesis of Porphine-like Substances —Hdqt
10-87-870-100-55-01-18 Reflection Spectra, Meteorite Analysis and Chemical Evo-
10-87-870-100-55-01-19 Evolution of Enzymes on Nucleic Acids —Hdqt
10-87-870-100-55-01-20 Physics of Cellular Synthesis, Growth and Division —Hdqt

02 INSTRUMENTATION FOR DETECTION OF EXTRATERRESTRIAL LIFE & LIFE-RELATED COMPOUNDS TASK AREA

10-87-870-100-55-02-01 Cytochemical Studies of Planetary Microorganisms —Hdqt
10-87-870-100-55-02-02 Detection of Microorganism on Other Planets —Hdqt
10-87-870-100-55-02-03 Radioisotopic Probe for Extraterrestrial Life —Hdqt
10-87-870-100-55-02-04 A Microscopic system for biological research —Hdqt
10-87-870-100-55-02-05 Detection of Extraterrestrial Life by Optical Rotation—Hdqt
10-87-870-100-55-02-07 Detection of Extraterrestrial Life by UV Spectrometry
10-87-870-100-55-02-08 Indentification of Organic Matter by Mass Spectrometry
10-87-870-100-55-02-10 Detection of Extraterrestrial Life by "J" Bands —Hdqt

03 SPECTROSCOPIC STUDIES OF PLANETARY ATMOSPHERES & SURFACES TASK AREA

10-87-870-100-55-03-01 IR Planetary Observations in the Stratosphere —Hdqt
10-87-870-100-55-03-02 IR Planetary Observatory in the Stratosphere —Hdqt

04 EXTRATERRESTRIAL SAMPLE COLLECTION & ANALYSIS TASK AREA

10-87-870-100-55-04-01 In-flight Photography and Recovery of Meteorites —Hdqt
10-87-870-100-55-04-02 Sampling for Microbes in the Stratosphere —Hdqt
10-87-870-100-55-04-03 Analysis for Hydrocarbons in Mineral Aggregates —Hdqt
10-87-870-100-55-04-04 Biogeochemical Studies of Meteorites —Hdqt
10-87-870-100-55-04-05 Development of Upper Atmosphere Sampler —Hdqt
10-87-870-100-55-04-06 Analysis of Carbonaceous Meteorites —Hdqt
10-87-870-100-55-04-07 Hydrocarbon Analysis in Detection of Life —Hdqt
10-87-870-100-55-04-08 Meteorite Studies —Hdqt

05 STERILIZATION OF SPACECRAFT TASK AREA

10-87-870-100-55-05-01 Sterilization of Space Probes —Hdqt
10-87-870-100-55-05-02 Sterilization of Spacecraft —Hdqt
10-87-870-100-55-05-06 Viability of Organisms in Simulated Space —Hdqt

91 MANNED SPACECRAFT SYSTEMS PROGRAM

19 Control Systems Sub-program

06 NOT REPORTED TASK AREA

10-91-910-101-19-06-14 Manual and Semi-Automatic Guidance & Navig. Techniques

23 Data Handling & Processing Sub-program

04 COMPUTERS & DISPLAYS TASK AREA

10-91-910-101-23-04-03 Techniques for Generation of Troubleshooting Guides

06 NOT REPORTED TASK AREA

10-91-910-101-23-06-13 Ground Display Techniques —Hdqt

09 PREDICTOR DISPLAYS FOR SPACE VEHICLES TASK AREA

10-91-910-101-23-09-05 Predictor Displays for Space Vehicles —Hdqt
10-91-910-101-23-09-06 Flight Display and Control Integration for Manned Spacecraft —Hdqt
10-91-910-101-23-09-07 In-Flight Job Aids —Hdqt

49 Human Performance & Behavior Sub-program

01 PERCEPTION TASK AREA

10-91-910-101-49-01-67 Human Engineering Design Criteria for Space Systems

04 MAINTAINING ASTRONAUT ALERTNESS TASK AREA

10-91-910-101-49-04-09 Maintaining Astronaut Alertness —Hdqt

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21 AMES RESEARCH CENTER

77 HUMAN FACTORS SYSTEMS PROGRAM

06 Advanced Concepts Sub-program

01 SYSTEMS ANALYSIS TASK AREA

21-77-770-100-06-01-01 Use and Experiments Study for Manned Orbiting Space Station —Ames

49 Human Performance & Behavior Sub-program

01 PERCEPTION TASK AREA

21-77-770-100-49-01-01 Neurohormonal Studies as Related to Space Flight Stresses
21-77-770-100-49-01-02 Pituitary Chemistry —Ames
21-77-770-100-49-01-03 Research in Cerebral Neurophysiology and Its Applications in Monitoring Behavioral States —Ames

02 ENVIRONMENTAL PHYSIOLOGY TASK AREA

21-77-770-100-49-02-01 Vision, Circulation and Respiration under Sustained Acceleration —Ames
21-77-770-100-49-02-02 Study of Long-Term Effects of Low G-loading on Mammals (mice, rats, etc.) —Ames
21-77-770-100-49-02-03 Metabolism of Animals as Influenced by Space Environmental Conditions —Ames
21-77-770-100-49-02-04 Radiation Dosimetry and Measurement —Ames
21-77-770-100-49-02-05 Theoretical Study of High Energy Radiations in Relation to Biological Systems —Ames
21-77-770-100-49-02-06 Effects of High G Loading on Metabolism —Ames
21-77-770-100-49-02-07 Pathological Studies on the Brains of Mice and One Monkey to be Exposed to Cosmic Radiation in High Altitude Balloon Flights —Ames
21-77-770-100-49-02-08 Space Physiology (Extension of NsG 139-61) —Ames
21-77-770-100-49-02-09 Histopathological Study of the Effect of Fission Fragments on the Central Nervous System and Selected Organs (NAS 2-1336) —Ames
21-77-770-100-49-02-10 Parametric Study of Flight-Induced Pulmonary Pathology
21-77-770-100-49-02-11 Electroneurophysiological—Task Performance Correlates
21-77-770-100-49-02-12 Biological Research with Heavy Ion Beams —Ames
21-77-770-100-49-02-13 Dosimetry of High Energy Radiation —Ames
21-77-770-100-49-02-14 Post-Mortem Clinical Analysis of Biological Specimens

03 BIO MEDICINE & PERSONNEL SELECTION TASK AREA

21-77-770-100-49-03-01 Ocular Impedance Plethysmography —Ames

04 PSYCO-PHYSIOLOGY & BEHAVIORAL SCIENCES TASK AREA

21-77-770-100-49-04-01 Auditory Perception During Space Mission —Ames
21-77-770-100-49-04-02 Visual Perception During Space Missions —Ames
21-77-770-100-49-04-03 Decision Making in Space System Operation —Ames

51 Physical Biology Sub-program

01 BIOCHEMICALS TASK AREA

21-77-770-100-51-01-01 Skilled Performance in Space Vehicle Control —Ames
21-77-770-100-51-01-02 Communication in Space Operations —Ames
21-77-770-100-51-01-03 Pilot's Ability to Cope with Sudden Changes in the Controlled Element —Ames
21-77-770-100-51-01-04 Application of Reliability Theory to the Allocation of Function Between the Pilot and the Vehicle Systems—Ames
21-77-770-100-51-01-05 Problem Areas Associated with Flight Through Turbulent Air —Ames
21-77-770-100-51-01-06 Vestibular Motion Cues Used by the Human Pilot —Ames
21-77-770-100-51-01-07 Human Pilot Control Problems in a Manned Planetary Landing —Ames
21-77-770-100-51-01-08 Design Principles for Display and Control Systems for Recovery from Unusual Attitudes —Ames
21-77-770-100-51-01-09 Human Pilot Control Problems in a Manual Abort of a Lunar or Planetary Mission —Ames
21-77-770-100-51-01-10 Effects of Individual Environmental Stresses of Space Flight on Human Pilot Performance —Ames
21-77-770-100-51-01-11 Biological Control Systems—A Comprehensive and Critical Review of the Field —Ames
21-77-770-100-51-01-12 Utilization of Bioelectric Potentials. Support Phase I

02 INFORMATION ACQUISITION TASK AREA

21-77-770-100-51-02-01 Operator Selection for Space Missions —Ames

03 CONTROLS & OPERATIONS TASK AREA

21-77-770-100-51-03-01 Development of Physiological Montioring Equipment for Use in Motion Flight Simulators and Aircraft —Ames
21-77-770-100-51-03-02 Piloted Simulator Requirements for Effective Research, Development, and Training —Ames

53 Life Support Sub-program

01 ATMOSPHERE CONTROL TASK AREA

21-77-770-100-53-01-01 Heat Regulation at Reduced Pressures —Ames
21-77-770-100-53-01-02 Regenerative Characteristics of Adsorbers Used in Environmental Control Systems —Ames
21-77-770-100-53-01-03 Closed Life Support System Optimization Studies —Ames
21-77-770-100-53-01-04 Effects of High Oxygen Tensions on Central Nervous System —Ames

03 WASTE DISPOSAL TASK AREA

21-77-770-100-53-03-01 Design Construction and Test of an Integrated Human Maintenance Subsystem —Ames

04 PROTECTIVE DEVICES TASK AREA

21-77-770-100-53-04-01 Improvement of the Ames Support and Restraint System
21-77-770-100-53-04-02 Anthropometric Devices for Planetary Exploration —Ames

06 BIO ENGINEERING TASK AREA

21-77-770-100-53-06-01 Arterial Pulse Pressure Ear Oximeter Telemetry —Ames
21-77-770-100-53-06-02 Study and Evaluation of Psychophysiological Monitoring Techniques for Use in Advanced Aerospace Missions
21-77-770-100-53-06-03 Biological Design Studies of Man —Ames

87 BIOSCIENCE PROGRAM

52 Behavioral Biology Sub-program

01 EFFECTS OF THE SPACE ENVIRONMENT ON BEHAVIOR TASK AREA

21-87-870-100-52-01-01 Behavioral Effects of Rotation and Acceleration —Ames
21-87-870-100-52-01-02 Neuroendrocrinological Aspects of the Inter-relationships Between Biological Rhythms and the Stresses of Space Flight —Ames

02 NEUROLOGICAL & BIOCHEMICAL BASES OF BEHAVIOR TASK AREA

21-87-870-100-52-02-01 Physiology of Vestibular Nulceus —Ames
21-87-870-100-52-02-02 "End Points" in Neural Organization —Ames
21-87-870-100-52-02-03 Vestibular Brain Mechanisms —Ames
21-87-870-100-52-02-04 Biochemical-Electrical Interrelationships in Simple Biological Information Storage Systems —Ames

04 EXPERIMENTAL ANALYSIS OF BEHAVIOR TASK AREA

21-87-870-100-52-04-01 Learning and Discrimination of Probability Schedule
21-87-870-100-52-04-02 Environmental Determinants of Behavior —Ames
21-87-870-100-52-04-03 Control of Complex Behavior in Infra-Human Organisms
21-87-870-100-52-04-05 Development of an Empirical Calculus of Reinforcement Value —Ames

54 Environmental Biology Sub-program

01 DEVELOPMENT OF EXPERIMENTS FOR STUDIES OF SPACE FLIGHT ENVIRONMENTAL EFFECTS ON ORGANISMS TASK AREA

21-87-870-100-54-01-05 Instrumentation of Small Animals for Radiation Detection

02 GROUND STUDIES OF SPACE FLIGHT ENVIRONMENTAL EFFECTS ON ORGANISMS TASK AREA

21-87-870-100-54-02-01 Effects of Low Magnetic Fields on Living Material —Ames
21-87-870-100-54-02-02 Amelioration of Radiation Effects by Dietary Control—Ames
21-87-870-100-54-02-03 Effect of High Magnetic Field on Living Material —Ames
21-87-870-100-54-02-05 Radiation Protection by Alteration of G-I Function —Ames
21-87-870-100-54-02-06 Study Long-term Effects of Low G-loading on Plants—Ames
21-87-870-100-54-02-08 Study Long-term Effects of Low G-loading on Single-celled Systems —Ames
21-87-870-100-54-02-09 Study the Direct Effects of Alpha Particle Radiation on the Rat Brain —Ames
21-87-870-100-54-02-10 Biological Effects of Ground Based Ionizing Radiation (X-rays) —Ames
21-87-870-100-54-02-11 Effects of Simulated Extraterrestrial Conditions on Somatic Mitosis and/or Mutation Rate —Ames
21-87-870-100-54-02-12 Effect of Space Voyage Stress on Synthetic Metabolic Processes —Ames
21-87-870-100-54-02-13 Nucleatide variations of certain tissues in Response to Some Environmental Alterations —Ames
21-87-870-100-54-02-14 Protein Synthesis of Different Tissues of the Rat in Response to Various Corticoids —Ames
21-87-870-100-54-02-15 Roentgenographic Estimation of Bone Age in the Cynomolgus Monkey —Ames
21-87-870-100-54-02-16 Effects of Simulated Extraterrestial Conditions on Immune Mechanisms —Ames
21-87-870-100-54-02-17 Enclosure Monitoring of Fibrinolysis —Ames

04 EFFECTS OF SIMULATED EXTRATERRESTRIAL ENVIRONMENTS ON EARTH ORGANISMS TASK AREA

21-87-870-100-54-04-02 Effects of Simulated Planetary Environment on Earth Organisms —Ames

05 STUDIES OF BIOLOGICAL MATERIALS & SYSTEMS FOR USE IN SPACE TASK AREA

21-87-870-100-54-05-06 Incorporation and Metabolism of Nitrogen by Plants

21-87-870-100-54-05-07 Comparative Effects of Protons and X-rays on Intestinal Injury and Recovery in the Rat, Dog, Guinea Pig, and Hibernating Mammals —Ames

55 Exobiology Sub-program

01 EVOLUTIONARY & THEORETICAL BIOLOGY TASK AREA

21-87-870-100-55-01-04 Synthesis of Protein Microspheres to Serve as A Cell Model for Research on the Origin of Life, etc. —Ames
21-87-870-100-55-01-06 Chemistry of Formation of Biologically-significant Molecules Under Primitive Earth and Extraterrestrial Conditions
21-87-870-100-55-01-07 Properties of Monolayers of Cell Membrane Components at Liquid Interfaces —Ames
21-87-870-100-55-01-08 Physico-Chemical Properties of Artificial Multilayer Systems
21-87-870-100-55-01-10 Effects of Extraterrestrial Conditions on the Metabolism of Tissue Maintained in Culture —Ames
21-87-870-100-55-01-11 Factors Controlling the Formation of Hereditary Materials
21-87-870-100-55-01-13 A Study of Molecular Structures and Reactions Occurring in Biological Systems Irradiated with Ultraviolet Light
21-87-870-100-55-01-14 Study of Smallest Replicating Units of Heredity —Ames
21-87-870-100-55-01-15 The Mechanism of Radiation-Induced Delay of Cell Division
21-87-870-100-55-01-16 Radiation Effects on Photosynthetic Organisms —Ames
21-87-870-100-55-01-17 Lipid Involvement in Photosynthesis —Ames
21-87-870-100-55-01-18 Structure of Nucleic Acids of Viruses —Ames

02 INSTRUMENTATION FOR DETECTION OF EXTRATERRESTRIAL LIFE & LIFE-RELATED COMPOUNDS TASK AREA

21-87-870-100-55-02-05 Life Detection in Planetary Models and Simulators —Ames
21-87-870-100-55-02-12 Life Detection Devices —Ames

04 EXTRATERRESTRIAL SAMPLE COLLECTION & ANALYSIS TASK AREA

21-87-870-100-55-04-01 Provide Laboratory and Suitable Technology for Detailed Analysis of Returned Extraterrestrial Samples —Ames
21-87-870-100-55-04-03 Analysis of Bio-organic Materials of Extraterrestrial Origin
21-87-870-100-55-04-19 Isolation of Viruses and Bacteria —Ames